



# ASIATIC SOCIETY

OF

BENGAL.

EDITED BY

THE SECRETARY.

### VOL. XIV.

PART I.—JANUARY TO JUNE, 1845.

Nos. 157 to 162.

NEW SERIE'S.

will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different of Asia will commit their observations to writing, and send them to the Asiatic Society, intta, it will languish if such communications shall be long intermitted; and will die away shall entirely cease."—Sin Wm. Jones.

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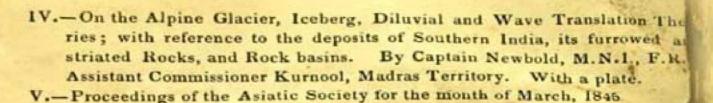
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### JOURNAL

OF THE

# ASIATIC SOCIETY.

Mr. Ivory's Tables of mean Astronomical refractions, revised and augmented by Major J. T. Boileau B. E. Superintending Magnetic Observatory Simla.

The first of these Tables was published in the Philosophical Transactions of the Royal Society for 1823, pp. 491, et seq: and a second paper and Table by the same author, appeared in the Philosophical Transactions for 1838. The mean refractions for Zenith distances under 83° correspond exactly in both the above Tables, but the refractions differ for Zenith distances between 83° and the horizon.

In Table I. of the original (of 1828) the mean refractions are given for each degree only as far as Z. D. 70° inclusive, and thence for every 10′ to the horizon. In the accompanying Tables intermediate numbers have been obtained by interpolation to differences of the third and second order, and they have been so arranged that the tabular refractions for that part of the Table of most practical utility shall vary only between one and two seconds.

The numbers in the original Table for the last degree of Zenith distance, however, were found to give such irregular differences that the whole of the intermediate numbers between the limits of 89° and 90° have been obtained by differences to the third order, from the mean refraction for 89° i. e. 24′ 26.″8, and the horizontal refraction 34′ 32.″ And although the alterations which this arrangement has



introduced are of no practical importance, the following detail of the interpolations is inserted here as a guarantee for the course which has been adopted.

TABLE I. Interpolations between numbers as in the Original Table of 1838.

TABLE II. Interpolations between Tabular refractions for Z.B. 89° & Z.D.90°

Zen. dist.	Mean refrac- tion,	Tab. diff. M.R.	d.,	d.	d. 3	Mean refrac- tion.	Tab. diff. M.R.	d.	d. 2	d. 3	+ or -
0	* * "	"	100000		-	011					410
89.00	24:16.80	OF S	Carrie		Trees.	24:26,80	-				
			39.17				***	30,2			
0.5	25:05.97	80	40.09	1.66	17 100	25:	80,1	611	1.7	6000	
10	25: 46.80	***	40.83	1.83	+.17	05.40 0	***	40.9	***	+.1	+0.03
Laure II	484	***	42.66	***	+.15	25:46. 9	***	42.7	1.8		10.10
15	26: 29.46	87.40	***	2.08	Harris State Company of the	26:29. 6	87.3	- 112	1.9	77.3	+0.10
20	27: 14,20	***	44.74	***	16	27:14. 2	***	44.6	***	+.1	+0.14
20	27 . 44.20	***	46.66	1.92	+.00	27:14, 2	***	***	2.0		5-155 C
25	28:00.86	95.30	***	1.98	1	28:00. 8	95.2	46.6	2.0	+.0	+0.00
	# +Hi	***	48 64	A Tase Call	-102		***	48.6		+.2	-0.06
30	28:49.50	***	50.74	2.10	6.40	28:49. 4	***	***	2.2		
35	29: 40.24	103,70	50.74	2,92	+.12	29:40-2	103.9	50.8		+.1	-0.10
	*	***	52.96		26		103.0	53.1	2.3	1.2	-0.14
40	30: 33.20	***	***	1,96		30:33. 3	***	***	2,5	550	
45	31 : 28.19	111.90	54.92	0.00	+.10		***	55.6		+.1	+0.10
7.0	# 100	***	£6.98	2.06	+1.16	31:28. 9	113.8	58.2	2.6	1.0	E 0 70
50	32 : 25.10			3.22		32:27. 1	***	***	2.8	Tes	+0.78
H. million	***	*****	60.20	***	+2.28	***	***	61.	***	+.1	+0.20
55	33: 26.30	Standard Control	65.70	5,50		33; 28. 1	164.9	***	2.9		N. Alexandre
90.00	34: 32.00	***	00.70	70.50	· 一样A.G	34:32.	-	63.9	***	***	+0.18

The numbers to which asterisks are affixed, are those of the original Table.

With a view to facilitate the computation of numbers still intermediate between those in the present Table, Log. differences corresponding to one minute of altitude and to one second of refraction, have been given in separate columns.

The Tables (II and III of 1838) containing the Log co-efficient for Barometric pressure and for temperature, have been extended by continuing the application of the tabular differences to the limits of practical utility, and the co-efficients of the correction for altitudes under 10° have been taken from their respective columns in the original Table I. and extended by interpolation as above.

The following examples, will explain the use of the Tables.

Let P. denote the height of the Barometer.

- " T. " the temperature, Fahrenheit.
- " T. " the Zenith distance of the object.

Log. Z.

Propl. part for 02'

190

Then as far as 80° of Zenith distance the log mean refraction is equal to Log. P. From TABLE I. + Log. T. From TABLE II. + Log. Z. From TABLE III, and to the refraction so found, must be applied the following corrections when the Zenith distance exceeds 80° vizt. — T. (T. — 50°.) — b. (30 in.— p.) The values of T. and b. will be found in TABLE IV. Example I. The observed Zenith distance of Capella being 80°, 24', 09."4. The height of the Barometer 29.73 and the Temperature 47.°75. Fahrenheit required the refraction? --9.99607 Log. P. 29.73 Table, 1. 0.00214 Table, II. ... Log. T. 47.75 3.08087 Log. Z. 88°: 20': 00 Table, 111. . . . Propl. part for 04': 09".4 = Q4'.157. .. 840 .. 20': 04".68 3.08748 Nearest Tabular refraction, Log. diff. 661 + 36 or Tab. diff. for 1".= + 18.37 T. (T.-50°) (Table iv.) = -.92+-2.°25=+2.32. b. (30 in. p.) (Table IV.) = -167 +, +.27 = - 0.45 .: .. 20': 24".92 Mean refraction, .. Example II. From the appendix to the Greenwich Transactions for 1836. To find the refraction for Zenith distance 83°. 22', the Barometer reading being 29.63 and Thermometer 58°.1. 9.99461 Log. P. 29.63 Table, 1. 9 99239 Log. T. 58.º1 Table, 11. 2.66759 83° 20' Table, 111.

.. 7': 30".21 2.65641 Nearest Tabular refraction,

Log. diff. 308.  $\div$  94 or Tab. diff. for 1." =, + 03.28 T. (T.-50°) Table iv,=,  $-.08 \times$ , + 8.1=,-00,65 b. (30 in. p.) ,,  $-.14 \times$ , +.37=, -00,05

Mean refraction by the tables, ... 7': 32."79

Ditto ditto by P. Bessel's Tables, appoint pendix, Gr. Tr. 1836, ... 7': 31."71

Refraction by Ivory's Tables, ... + 1".08

When the altitude of the body is observed it is dvisable to convert it into Zenith distance by subtraction from 90°, the proportional parts of the Logs. being then additive.

Example III. The altitude of the sun's lower limb was observed 45°: 15': 42"5, the Barometer standing at 23.33, and the Thermometer at 47.2 Fahrt. required the refraction.

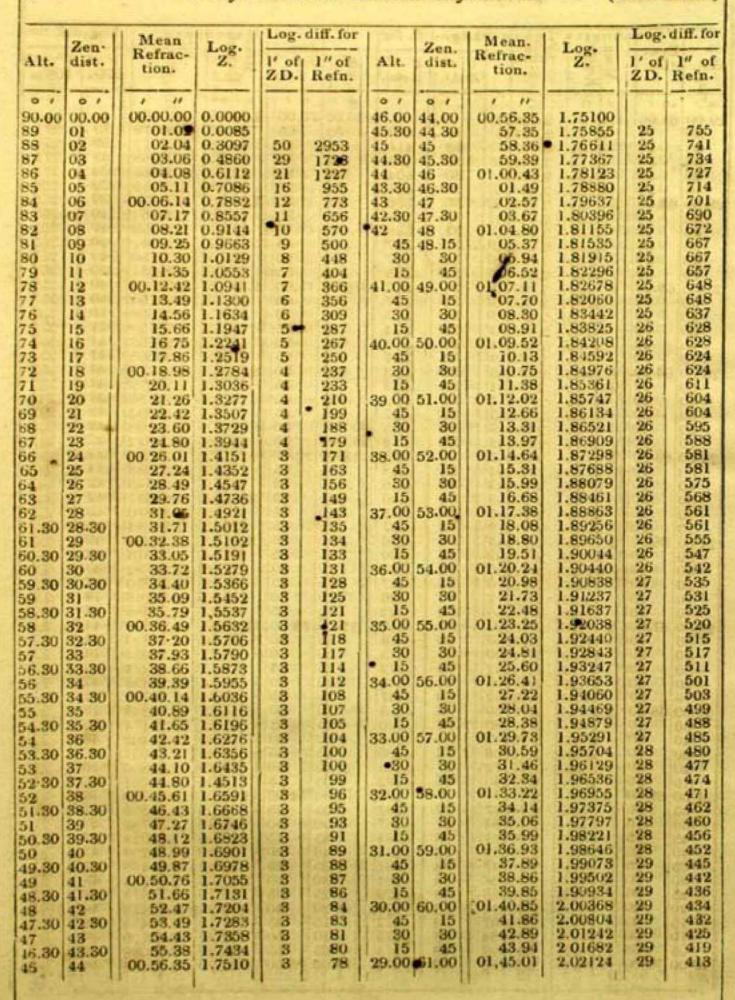
 $(90^{\circ} - 45^{\circ}: 15.' 42''.5) = 44^{\circ}: 44': 17''.5. = Z.$ 23.33 Table I. Log. P. 9.89079 Log. T. 47°.2 Table II. 0.00266Log. Z. 44°: 30' Table III. 1.75855 Prop. part for 14'.292 do. 357 0': 44."80 1.65557 Nearest Tabular number, Log. diff. 43 + 96 or Tab. diff, for 1"= + 0.45 0': 45."25 Mean refraction,

The following errata in the Original Table (Phil. Trans. for 1838) have been corrected.

H.E.I.C. Magnetic Observatory, Simla, December, 1842.

(Table I.) Ivory's mean Astronomical Refractions. (Table II.) 5

7-1	FAHRENH	EITS '	l'HER!	MOMETER.		BAROMETER.							
Temp.	Log. arithm.	Diff. 1 deg.	Temp.	Log. arithm.	Diff. 1 deg.	Height	Log.	Diff.0-1 Inch.	Height.	Log. arithm.	Diff.0.1 Inch.		
10	0.03952 0.03849	103	• 70 71	9.98240 9.98049	91	Ins. 32.0 31.9	0.02803 0.02667	136	Ins. 26.0 25.9	9 93785 9 93618	167		
12 13 14	0.03746 0.03644 0.03542	103 102 102	72 73 74	9.97958 9.97867 9.97777	91 91 90	.8	0.02531 0.02394 0.02257	136 137 137	.8 .7 .6	9.93450 9.93281 9.93112	168 169 169		
15 16 17	0.03440 0.03338 0.03237	102 102 101 101	75 76 77	9.97686 9.97596 9.97509	91 90 90	• .4	0.01119 0.01931 0.01842	138 138 139	.5 .4 .3	9.92942 9.92771 9.92600	170 171 171		
18 19 20	0.03136 0.03034 0.02933	101 102 101 101	78 79 80	9.97416 9.97326 9.97237	90 90 89 89	.2 .1 31.0	0.01703 0.01564 0.01424	139 139 140 140	.2 .1 25.0	9.92428 9.92255 9.92082	172 173 173 174		
21 22 23	0.02832 0.02730 0.02630	101 100 100	81 82 83	9.97148 9.97058 9.96969	90 89 89	30.9	0.01284 0.01143 0:01002	141 141 142	.8 .7	9.91908 9.91733 9.91558	175 175 176		
24 25 26 26	0.02531 0.02432 0.02332	99 100 100	84 85 86 87	9.96880 9.96791 9.96703 9.96615	89 88 88	.6 .5 .4	0.00860 0.00718 0.00575 0.00432	143 143	.6 .5 .4 .3	9.91381 9.91204 9.91087 9.90849	176 177 178		
27 28 29 30	0.02232 0.02133 0.02034 0.01935	99 99 99	88 89 90	9 96527 9 96440 9 96352	88 87 88 87	.1 30.0	0.00289 0.00145 0.00000	144 144 145	.2 .1 24.0	9.90669 9.90489 9.90308	180 180 181		
31 32 33	0.01837 0.01738 0.01640	98 99 98 99	91 92 93	9.96265 9.96177 9.96089	88 88 87	29.9 .8 .7	* 9.99855 9.99709 9.99563	145 146 146 146	23.9 .8 .7	9,90127 9 89946 9,89763	181 181 183 184		
34 35 36	0.0154I 0.01444 0.01346	97 98 98	94 95 96	9.96002 9.95914 9.95827	88 87 87	.6	9.99417 9.99270 9.99123	147 147 148	.6	9.89579 9.89395 9.89209 9.89023	184 186 186		
37 38 39 40	0.01248 0.01151 0.01053 0.00957	97 98 96	97 98 99 100	9.95740 9.95953 9.95567 9.95480	87 86 87	.3 .2 .1 29.0	9.98975 9.98826 9.98677 9.98628	149 149 249	.3 .2 .1 23.0	9.88837 9.88649 9.88460	186 188 189		
41 42 43	0.00861 0.00764 0.00668	96 97 96	101 102 103	9.95394 9.95307 9.95220	86 87 86 86	28.9	9.98378 9.98227 9.98076	150 151 151 152	22.9 .8 .7	9.88271 9.88081 9.87890	189 190 191		
44 45 46	0.00572 0.00476 0.00380	96 96 96 95	104 105 106	9.95135 9.95050 9.94965	85 85 85	.6 .5 .4	9.97924 9.97772 9.97620	152 152 153	.6 .5	9.81699 9.87506 9.87313	193 193 195		
47 48 49	0.00285 0.00190 0.00094	95 96 94	107 108 109	9.94880 9.94794 9.94709	86 85 84	.3	9.97467 9.97313 9.97159 9.97004	154 154 155	.3 .2 .1 22.0	9.87118 9.86923 9.86727 9.86530	196 197 197		
50 51 52	0.00000 9.99906 9.99811	94 95 94	110 111 112 113	9.94525 9.94540 9.94455 9.94371	85 85 84	28.0 27.9 .8 .7	9.96848 9.96692 9.96536	156 156 156	21 9	9,86332 9,86134 9,85934	198 198 200		
53 54 55 56	9.99717 9.99623 9.99529 9.99434	94 94 95	114 115 116	9.94287 9.94203 9.94119	84 84 84 84	.6 .5	9.96379 9.96221 9.96063	157 158 158 159	.6 .5 .4	9.85733 9.85532 9.85329	201 201 203 203		
57 58 59	9.99341 9.99248 9.99154	93 94 93	117 118 119	9.94035 9.93951 9.93868	84 83 83	.3 .2 .1	9.95904 9.95745 9.95585	159 160 161	.3 .2 .1 21.0	9.85126 9.84921 9.84716 9.84510	205 205 206		
60 61 62	9.99061 9.98969 9.98875	92 94 92	120 121 122 123	9.93785 9.93701 9.93618 9.93535	84 83 83	27.0 26.9 .8 .7	9.95424 9.95263 9.95101 9.94939	161 162 162	20.9 .8 .7	9.84310 9.84303 9.84094 9.83885	207 209 209		
63 64 65 66	9 98783 9,98690 9,98598 9,98506	93 92 92	124 125 126	9.93452 9.93370 9.93288	0.0	.6	9.94776 9.94612 9.94448	164	.5	9.83675 9.83463 9.83251	310 212 212 214		
67 98 69	9.98414 9.98323 9.98231	91 92	127 128 129	9 93205 9.93120 9.93041	92	3.2	9.93952	165 166	3 .2 .1	9.83037 9.82883 9.82607 9.82391	214 216 216		
70	The second secon		130	9.92958		26.0	9.93785		20.0	3.02331	1		





DOLLAR.	7	4 ti	Loga-	Log. diff. for   1			Zen.   5 Loga-			Log. diff. for		
Alt.	Zen. dist.	Mean. Refract,	rithm.	1' of			dist.	Mean Refract.	rithm.	1' of		
A \$40	(F) ASSES	28	4.	Z. D.	Refn.	- Delo	3.4332	25		ZD.	Refn.	
0 1	0 /	1 11		To the		0 /	0 /	0 #	0.00105	1		
29.00	61.00	1.45.01 45.73	2.02124 2.02420	30	412	20.00	70.00	2.19.36	2.20185	39	271	
40	20	46.45	2.02717	30	411	50	10	40.59	2.20573	39	271	
30 20	30 40	47.19 47.93	2.03015	30	404	45 40	15 20	41.31	2.20768 2.20963	39 39	271 271	
10	50	48.68	2.03616	30	401	35	25	42.78	2.21159	39	266	
28.00 50	62.00	1.49.44 50.20	2.03918 2.04221	30	398 398	30 25	30	2.43.52 44.26	2.21356 2.21554	39 40	266 265	
40	20	50.97	2 04526	31	396	• 20	40	45.01	2.21752	40	265	
30 20	30 40	51.76 52.55	2.04832	31	387 387	15	45 50	45.77	2.21951 2.22150	40	262 262	
10	50	53.35	2.05445	31	385	05	55	47.30	2.22351	40	261	
27.00 50		1.54.17	2.05755	31	377 377	19.00	71.00	2.48.08 48.86	2.22552 2.22754	40	259 258	
40	20	55 82	2 46377	31	377	50	10	49.65	2.22956	40	256	
30		36.66 57.50	2.06690 2.07004	31	374 373	45	*15 20	50.45	2.23159 2.23363	41	254 254	
10	50	58.35	2.07319	32	371	35	25	52.06	2.23568	41	253	
26.00		2.00.10	2.07635 2.07954	32	363 363	30 25	30	2.52.87	2.23773 2.23979	41	253 349	
40	20	00.99	2.08274	32	360	20	40	54,53	2.24186	41	249	
30		01.89	2.08595 2.08918	32	357 355	15		55.87	2.24394 2.24603	42	248 248	
20 10	50	03.72	2.09242	32	352	05	55	57.06	2 24812	42	246	
25.00	65-00	2.04.65	2.09567	33	350	18 00		2.57.92 58.79	2.25022 2.25233	42	244	
5(		05.59 06.54	2.09894 2.10223	33	346	50	10	59.66	2,25445	42	243	
30	30.	07.51	2.10553	33	340 339	45		3.00.54	2.25657 2.25870	42	241	
20 10	50	08.49 09.48	2.10885 2.11219	33	337	35	25	02.33	2.26084	43	238	
24.00	65.00	2.10.48	2.11555	34	336	30		3.03.23			238 237	
50		11.50 12.53	2.11892 2.12230	34	330 328	25		04.14			236	
3	0 30	13.57	2.12570	34	427	1:	45	05.99	2.26950	44	234	
21		14.62 15.69	2.12912 2.13256	34	326 322	03		06.93			233	
23.0	0 67.00	2.16.78	2.13602	35	317	17.0	73.00	3.08.83	2.27608	44	228	
5 4	0 10		2.13950 2.14300	35	316	55					221	
3			2.14652	35	312	4	15	11.75	2.28274	45	227	
2	0 40		2.15006 2.15862		308	3			2.28498 2.28728		22	
22.0	0 68.00		2.15720	36	363	30	30	3.14.75	2.28948	45	22	
5	0 10	24.81	2.16080		300	2 2					22	
	0 20			36	296	1	5 45	17.83	2.2963	46	22	
2	0 40	28.50	2.17172	37	395	1 0			2.29860		22	
	0 69.00				290	16.0	0 74.00	3.21.01	2.30323	3 46	21	
	5 05	31.69	2,18097	37	287	5					21	
	15 15			37	287 384	4		24.28	2.3102	3 47	21	
	10 20	33.6	6 2.18659	38	284	4	0 20	25.89	2.3125	9 47		
	35 21 30 30			38			5 25				24	
	25 35	35.6	8 2.19226	38	279	2	5 35	28.79	9 2,3197	3 48	20	
	20 40	36.3	6 2.19416	38			5 40				Control of the Contro	
	15 4			4 38	275		0 50	32 3	2.3269	6 48	20	
1 200	05 5	5 38.4	5 2.1999	2 89		The Real Property of	0 75.0					
20	00 70.0	0 2.39.1	6 2.2018	35		1,000	10.0	3.04.71	1 2.0010			

E		Zen.	9 2	Loga-	Log.	diff. for		Zen.	11 9 5	Loga-	Log	diff. to	
1	Alt.		Mean Refract.	rithm	l' of		Alt.	dist.	Mean efract.	rithm.		1" of	
-				17	Z. D.	Refn.		44,200	_ ×	2.	ZD.	Refn.	
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1	50	10	37.15	2.33677	49	201	55 50			2.50887 2.51237	69 70	135	
	45		38.39	2.33925	50	200	45	15	28.01	2.51589	70	133	
	40 35		39.65 40.93	2.34174 2.34424	50	197 197	40			2.51943 2.52300	71	132	
	30	30	3.42.21	2.34676	50	196	35	30	5.36.20	2.52660	71 72	131	
1	25 20	35	43.52		51	196	25	35	39.02	2.53020	72	128	
	15	40 45	44.82 46.14	2.35183 2.35438	51	195° 193	20 15		41.88	2.03387 2.53755	73 74	128 127	
1	. 10	50	47.48	2.35695	51	192	10		47.74	2.54125	74	125	
1	1.00	76.00	48.84 3-50.21	2.35953	52	190	05	55	50.74	2.54498	75	124	
1"	55	05	51.60	2.26212 2.36473	52 52	129	09 00	81.00	5.53.79 56.89	2.54874 2.55253	75 76	123 122	
1	50	10	53 00	2.36735	52	187	50	10	6.00.04	2.55635	76	121	
13	45	15 20	54.42 55.85	2.36998 2.37263	53	185 185	45	15	03.24	2.56019	77	120	
	35	25	57-30	2 37529	53	183	40 35	20 25	06.50	2.56409 2.56798	78	119	
1	30	30	3.58.76	2.37796	53	183	30	30	6.13.18	2.57192	79	117	
1	25 20	35, 40	4.00.24	2.38064 2.38334	54 54	181 180	25 20	35 40	16.61 20,09	2.57589	79	116	
1	15	45	03.26	2.38606	54*	179	15	45	23.64	2.57989 2.58393	80 81	115	
	10	50	04.79	2.38879	55	178	10	50	27.26	2.58800	81	112	
13	05	55 77-00	06.34 4.07.91	2.39154 2.39430	55 55	177	08.00	55 82.00	30.94 6.34.68	2.59210 2.59624	82 83	111	
1	55	05	09.50	2.39708	56	175	55	05	38.49	2.60041	83	109	
	50 45	10	11.11	2.39987 2.40268	56 56	173	50	10	42.37	2.60462	84	109	
	40	20	14.39	2.40550	56	172 171	45 40	15 20	46.31 50.33	9.60886 2.61313	85	108	
	35	25	16 06	2.40834	57	171	35	25	54.42	2.61774	86	105	
1	30 25	30 35	4.17.75 19.46	2.41119	57	169	30 25	30 35	6.58.59 7.02.85	2.62179 2.62618	87	104	
	20	40	21.19	2.41695	58	167	20	40	07.19	2.63062	88	103	
1	15	45	22.95	2.41986	58	165	15	45	11.62	2.63509	89	101	
	10 05	50 55	24.72 26.51	2.42278 2.42572	58 59	165 164	10 05	50 55	16.13	2.63961 2.64417	90	100	
13	00-5	78.00	4.28.33	2.42867	59	- 162	07.00	83.00	7.25.42	2.64877	92	98	
	55 50	05 10	30,17	2.43164 2 43464	59	161	55	05	30.21	2,65341	93	97	
	45	15	33.93	2.43764	60	160 159	50 45	10	35.09 40.07	2.65809 2.66282	94 95	96 95	
1	40	20	35.84	244066	60	158	40	20	45.15	2.66759	95	94	
18	35	25 30	37.78 4.39.75	2.44370 2.44677	61	157 156	35 30	25 30	50.34 7.55.64	2.67241 2.67727	96	93	
	25	35	41.74	2.44985	62	155	25	35	8.01.04	2.68218	97 93	92	
	20	40	43.76	2.45295	62	153	20	40	06.55	2.68713	99	90	
1	15	45 50	45.81 47.89	2.45608 2.45902	63 63	153 151	• 10	45 59	12.19	2.69213	100	89	
1	05	55	49.99	2.46238	63	151	05	55	23.84	2.70229	101	87	
П		79.00	4 52.12	2.46556	64	149	06.00	84-00	8.29.86	2.70746	103	86	
	55 50	05	54.28 56 47	2,46876 2,47198	64	148	55 50	10	36.02 42.31	2.71267 2.71793	104	85	
	45	15	58.69	2.47552	65	146	4.5	15	48,75	2.72225	106	83	
1	35	20 25	5.00.91	2.47848 2.48176	65	145	40	20	55.33	2,72862	107	81	
	30	30	05.54	2.48507	66	143	35	25 30	9.02.04	2.73405 2.73954	109	81 79	
1	25	35	07.89	2.48840	67	142	25	35	16.03	2.74509	111	-79	
1	20 15	40 45	10.28 12.70	2.49175 2.49513	67 68	140	20 15	40	23.25 30.65	2.75070 2.75637	112	78	
1	10	50	15.66	2.49853	68	138	10	50	38.23	2.76210	115	76	
100	.00	80.00	5 20 19	2.50196	69 69	137	05 30	55	46.00	2.76970	116	75	
100		80.00	5.20.19	2.50541	09	136	05.30	90.00	9,53.96	2.77376	117	74	
-	100					The second second		-	Section 1		-	STATE OF THE PARTY OF	

					17	AT OF PART	-	_	7877		U O	
	Alt.	It. Zen.   Mean.   Loga-		Log.	diff. for		Zen.	Inerm	ometer	Daro	meter.	
		dist.	Refract.	rithm.	1' of	1" of	Alt.	dist.	700	diff, for		diff.for
		12	W. HINGE	Z.	Z. D.			No Sept.	T.	I'Z.D.	В.	I'Z.D.
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	05.00		9.53.96	2.77376	ME C	Salvaria Co	10.00	80.00	.03	6 B	100	DA AN
			10.02.13	2.77969	119	73	09.00	81.00	.04		.04	100 m
	55 50	10	10.52	2,78569	120	72	08.00	82.00	.05		.05	· ( )
-	45		19.11	2.79176	121	71	30	82.30	.06	-5.00	.08	100
	40	20	27.90	2.79789	123	70	07.00	83,00	.07	.001	-10	
6	35 30	25 30	36.93 46.21	2.80409 2.81037	124 126	69 68	45 30	83.15	.08		.11	.001
	25	35	10.55.75	2.81673	127	67	15	45	.09	65 31	.14	Marin 1
	20	40	11.05.55	2.82316	128	66	05.00	84.00	.10	23.3	.15	F-8 11 -
	15		15.60	2.82967	130	65	45	15	.11	200	.16	.002
	10	50	25.90	2.83626	132	61	30	30	.12	6	-18	
-	05	55 86.00	36.31	2.84293	133 136	63	0.15	85.00	.13	.002	.20	Elle/
	04.00	05	58.66	2.84968 2.85652	137	61	50	10	.17	.002	-24	.003
	50	10	12.10.21	2.86345	139	60	40	20	.18	1-1-1	.27	
	45	15	22.10	2.87046	140	59	30	30	.20	E 2 (1)	.29	
	- 40	20	34.34	2.87757	142	58	30	40	.21	000	.32	365333
	35	25 30	46.94 12.59.92	2.88476 2.89205	144	57 56	04.00	50 86.00	.23*	.002	.34	.004
N.	25	35	13.13.31	2.89205	146	55	50	10	.26	.003	.39	1004
	25 20	40	27.11	2.90693	150	54	40	20	.29	1-1-1	-43	
	15	45	41.34	2.91462	152	53	30	30	.31	100	-47	
	10	50	55.99	2.92220	154	52	20	40	.34		.51	1005
	05	55	14.11.13	2.92999	156	51	03.00	*50 87.00	.36	.004	.62	-461.F
	03.00	87.00 05	26.76 42.90	2.93790	158	50	55	87.00	.41	1004	.67	.008
	50	10	59.54	2.95402	162	49	50	10	.43		.71	100000
	45	15	15.16.75	2.96225	165	48	45	15	.45		.75	
1	40	20	34.55	2.97060	167	47	40	20	-47	.005	.79	1
1	35	25	52.93	2.97906	169	46	35	25	.50		.83	146
	30 25	30 35	16.11.95 31.64	2.98764	172 174	45	30 25	30	.52	HA.	.91	.010
	20	40	52 03	3.00519	177	43	20	40	.58		.96	
7	15	45	17.13.16	3.01417	180	43	15	45	.61	1	1.01	.012
	10	50	35.06	3.02329	182	42	10	50	.63	.006	1.07	A PER
	05	55	57.77	3.03254	185	41	05	55	.66		1.13	213 300
H	02.00	88 00	18.21.33	8.05144	188	40 39	02 00 55	05	.69	.009	1.24	.017
	55 50	05 10	18.45,76 19.11.07	3.05144	193	38	50	10	.78		1.32	
	45	15	19.37,35	3.07091	196	37	*45	15	.83	25 A	1.41	100
	40	20	20.04.68	3.08087	200	36	40	20	.87	1	1.50	
	35	25	20.33.09	3.09099	202	36	35	25	.92	011	1.58	1000
1	30	30	21.02.60	3.10127	206 209	35 34	30 25	30	.96 1.02	.011	1.75	.025
1	25 20	35 40	21.33.28 22.05.22	3.11170 3.12229	212	33	20	40	1.07	012	1.87	
4	15	45	22.38.47	3.13305	215	32	15	45	1.13		2,00	4923
	10	50	23.13.11	3.14398	219	32	. 10	50	1.19	.013	2.12	Section 1
-	05	55	23 49.2	3.15509	222	31	05	55	1.26 1.32	.028	2.24 2.36	1000
		89.00	24.26.8	3.16637	226 229	30*	01.00	89.00	1.42	.020	2.48	.043
	.55 50	10	25.06 25.46.9	3.18947	233	28	50	10	1.52		2.70	The second second
-	45	15	26.29 6	3, 20130	237	27	45	15	1.62	No.	2.91	a deposit of
	40	20	27.14.2	3.21331	240	27	40	20	1.72	DELICE !	3.13	
	35	25	28.00.8	3.22551	244	26	35	25	1.82		3.34 3.56	.058
4	30	30	28.49.4	3.23789	248	25 25	30 25	30 35	2.06		3.77	
	25 20	35 40	29.40 2 30.33.3	3.25046 3.26323	251 255	24	20	40	2.20		4.05	Total Control
il.	15	45	31.28.9	3.27620	259	23	15	45	2.34	100	4.34	.067
1	10	50	32.27.1	3.28938	264	23	10	50	2.48	.026	4.67	1
1	05	55	33,28,1	3,30278	268	22	05	55	WEST !	-	5.00	B. Share
-	00.00	90.00	34.32	3.31639	272	21 •	00.00	90.00				
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An Eleventh Memoir on the Law of Storms in India, being the Stroms in the Bay of Bengal and Southern Indian Ocean, from 26th November to 2d December, 1843. By Henry Piddington; with a Chart.

In this memoir, for much of the material of which I am as usual indebted to the zealous exertions of Capt. Biden, Master Attendant of Madras, we have the advantage of tracing at the same time storms raging on the North and South sides of the Equator, of having a register of the weather almost upon the Equator while the storms were blowing on both sides, and finally of tracing with abundant data in the dangerous "Storm track" (as I have called it in another publication,)\* extending from 5° to 15' South and from 75° to 90' E. a most severe hurricane, and this investigation has moreover developed a new feature in these storms, viz. that there are some which are comparatively stationary! having but an exceedingly slow progressive motion; and should this be found by future research to prevail frequently, it will be of importance both in our theoretical and practical views of storms. It will be found in the postcript to the Memoir that after this was sent to the press I obtained from the Mauritius, the details of a storm there, in which a vessel, the Charles Heddle, was fully proving for us by what I may call a beautiful experiment, the truth of our researches here!

I have as usual first given the documents carefully abridged, then a Tabular view of them for each hemisphere, a summary of the grounds from which the positions of the centres of the storms on different days are developed, and finally a few remarks on the whole.

# Copy of Report kept at the Master Attendant's Office Madras, from Captain BIDEN.

30th November 1843.—6 A. M. North West wind, North current strong and high surf. 7 A. M. North West wind, current very strong, high, and irregular surf, ... 30.012 1st December 1843.—6. A. M. North West wind, North current, strong, high and irregular surf no boats or Cattamarans could cross the surf. Rain, ... 29.984

Barometer. 8 A. M. 4 P. M. 10 P. M.

30.012 29.925 29.997

29.984 29.877 29.953

· Horn Book of Storms p.-



	B		
An arrived condition and attenued the Stand white and would	8 A. M.	4 P. M.	10 P. M.
2d December 1843 6 A. M. North West wind, North cur-			
rent, strong irregular and high surf, cloudy,	29.944	29.861	29.916
Ditto 5.30, P. M. North wind, North current, strong and			
very high surf, no boats or Cattamarans could cross the surf. Raining, e			
3d December 18434-55, A. M. North East wind, North			
current and high surf; cloudy weather,	29.956	29.893	29.986
Ditto3-15, P. M. South East wind, South current, high			
surf and rain,			
Ditto 6 P. M. South East wind, South current and rain,			
4th December 1843 5 A. M. East wind, South current,			patas a
high and irregular surf ; drizzling rain,	30,008	29.912	29.988
Ditto.—10-30, A. M. East wind, South current strong, and moderate surf,			
(Signed)	- Cu	RLES B	DEN
(Signal)			The state of the s

### Abridged Log of the Ship Vernon, Captain J. Gimblett, from Madras to Calcutta, reduced to civil time.

The Vernon left Madras roads, on the 30th November 1843, at 7. P. M. and stood to the East, with a fresh monsoon from N.N.E. till midnight.

1st December.—A. M. strong breeze N. N. E. till noon when Lat. 12° 5′ N., Long. Chro. 83° 29′, E., Bar. 29.68., Symp. 29.52:, P. M. fresh gales to midnight with the wind veering at 9 P. M. to N. E. and at midnight to E. N. E.

2d December.—A. M. heavy squals; at 2 wind shifted to E. S. E. with confused sea and much lightning, Bar. 29.54. 9 A. M. wind E. by S. moderating a little; noon squally and heavy sea Lat. D. R. 11° 48′ N. Long. D. R. 83° 38′, Bar. 29.69., Symp. 29.54. Ther. 81° P. M. strong gale Easterly, moderating to fine, at 7 P. M. when wind at E. N. E.



12 Eleventh [No. 157. Tabular Memorandum of the state of the Weather as observed during a Passage from Calcutta towards the Mauritius with latitude and longitude, state of the Thermometer, both air and water every day at Noon, Moon's age &c. Together with the force At 9 P. M. strong squalls and heavy rain, took in and made sail accordingly; passed the ship Hooghly of very little warning from their first appearance above the horizon; heavy rain attending the squalls. Strong gales, short confused sea, ship labouring much; at 11 P. M. most terrific squalls accompa-Dark gloomy and wild ap-Observed the most severe squalls these last three days to commence with drizzling small rain after ship must be well prepared to meet them, to save so that no dependence could be placed upon it, Sudden dangerous gusts and violent squalls, with nied with torrents of rain, dark dismal weather, which (generally) follows torrents of rain, accompanied with most violent and terrific squalls. A the canvas and spars from destruction; Barometer rising and falling during the squalls and rain, varying at times in an hour, from 29,74, to 29,57, &c. Succession of dangerous squalls and thick weather. and Direction of the Winds and state of the Weather, immediately preceding as well as during and after the various gales. Fine clear weather and smooth water. reduced sail to double reef top-sail. Fresh breezes and cloudy weather. Explanatory and General Remarks. From 4 A.M. to noon. pearance. London. clouds 784 E. N. E. Strong squally. of heavy rain the \$4 hours and gloomy weather. -North and thick gloomy Wr. N. N. W. [heavy rain. N. W. Throughout. ... N. N. W. Contin. throughout ŧ Cviolent squalls vaviolent varying ŧ rying to dark gloodismal weamoderntgloomy appearance. Ī Strong Ling. 1 · ning and Squally. stated ther. ı Calm and pron. Calm weather. N. E. steady. N. E. N. N. E. Vble. to N. N. W. N. N. E. W. and West East zz 1 12 839 824 Ther. Pir 1 1 12 62 20 ŧ 켮 1 ŧ 784 1 12 ŧ 12 8 1 200 ŧ 8 ŧ :00 ŧ of Bar. Height 2822282 588 222222 2 25 8 2222 = 1 1 1 111 ŧ 2 I 1 1 1 1 1 1 1 1 Moons age. 1 1 i . 1 1 i 1 1 ł 1 -H I 1 1 i 35 56 E. S 55 K 86 30 E. 87 SA E. 86 23 E. Latitude & Longi-87 10 E. .... 85 48 E. 85 58 E 86 0 E. . --= ---\*\*\*\*\*\* tude at Noon. 4 21 8. 3 16 8. 16 43 N. 7 4 N. 80 N. 9 40 N 4 £7 N. 16 27 N 1 1 8. 0 ! --= = ==== = -Capt. WEBB, Ship WINIFRED. Noon. Noon, ... Noon, ... Noon, ... Noon, .... Noon, ... 8 P. M .... Noon, ... S P.M .... Noon, ... 8 P. M. ... 4 A.M. 8 P. M .... Noon. 8 P. M .... A.M.... 4 A. M. 8 P. M .... 4 A. M. 8 P. M .... + A.M ... 4 A.M.... Α.Μ.... A.M.... Hour. the Date in nautical time. Nov. 29th, Nov. 27th. Dec. 1st,... Nov. 28th Nov. 30th Bay of Ben- Nov. 24th. Nov. 25th, Nov. 26th 1843. Dec. 2d. South Lat .... Ocean, ... Part of

1845.



Report of the Barque Niagara Capt. W. Champion, forwarded by Captain Biden.

Friday 1st December 1843.—Lat. 10° N., Long. 87° E., experienced a hard gale from S. W. to E. S. E. with a tremendous high sea on; lost sails and sustained other damage, strong gales from Eastward on Saturday the 2d. On approaching the coast, found the weather more moderate and a smoother sea; during the above days it rained incessantly, and the Bar. fell to 29.10. Ther. 78° 40′.

Abridged Log of the Ship Candahar, Capt. W. Ridley, from the Mauritius bound to Calcutta; reduced to civil time.

26th Nov. 1842.—Wind variable from N. N.E., N. b. E., and N. E. b. N., Course North 54° W. 94', Lat. account 8° 19' N., Long. 84° 38' E., heavy squalls Bar. 29:80.

27th November.—To noon cloudy, wind N. E., strong wind till midnight when N. E. b. E., Lat. noon 9° 5' N., Long. 83° 50', Sunset heavy squalls, Bar. not marked.

28th November.—Strong Monsoon N. E. b. E. 2 A. M. veering to Northward 11 A. M. Violent squall; noon heavy weather, Lat. account 9° 15′ N., Long. E. 83° 45′, heavy squalls and strong monsoon till midnight. Bar. 29.70.

29th November.—Heavy breeze N. b. E. with squalls, noon every appearance of a storm, Lat. 9° 26' N., Long. 83° 48' E. 4 P. M. rapidly increasing. At 6 wind North; laid to, heavy squalls and rain, Bar. 29.7.

30th November.—Heavy gales, and tremendous squalls. Wind I A. M. N. W. by N. Lat. 9° 40', North, Long. 83° 57' E. 11 A. M. terrific squall of wind and rain. Bar. 29.50. P. M. heavy gale N. W. to midnight.

1st December.—A. M. heavy gale N. W. with terrific squalls. At 2 A. M. wind N. b. E. 8 A. M. N. W. b. W. Noon, to 3 P. M. very little wind, Lat. 10° 32′ North, Long. 84° 3′ E. At 3 P. M. wind shifted to S. W., Bar. fell to 29.40., 5 P. M. shifted again to N. W., 9 P. M. set fore-sail; at 10 wind veered again to S. W., midnight, gale appearing steady, shook out close reefs, steering North.

N. B.—From 11 A. M. to midnight steering North 4' per hour. At 11 and 12, 41 per hour.

2nd December.—1 A. M. gale suddenly increased to a most violent storm S. W., hove to under try-sails; 4 A. M. South. 5 to 6 raging with increased fury, Bar. 29.40, 8 A. M. more moderate, bore up steering North 6 miles. At 10 wind South. Noon Lat. account 11° 10′ North, Long. 84° 04′ E., Bar. A. M. 29.60, 2 P. M. steering N. N. W. wind S. S. E. at 4 N. W. by N. wind S. E. 11 P. M. passed a ship, steering to the S. W. midnight. Bar. 29.80.

3rd December.—A. M. Strong breeze S. E. day-light steady, noon Lat. Obs. 12° 31', Long. 84° 7', fine weather.

Abridged Log of the Ship Fazzulbarry, Capt. H. Handley from Bombay bound to Calcutta, reduced to civil time.

27th November. 1843.—At noon moderate breeze from E. S. E. but threatening looking weather to the Eastward. Lat. 5° 38' N., Long. Chr. 88° 40', Bar. 29.72, and falling, Ther. 82°. For the last two days, current 110 miles to the Westward. Remark by Capt. Handley, at the beginning of this log. "Observed many thick white clouds densely packed to the Eastward which I have always found to precede an Easterly gale."

P. M. Strong breezes Easterly (and at 8 P. M. E. N. E.) dark cloudy weather and very threatening appearance to the Eastward with heavy N. E. sea on, increasing to a strong gale with dark threatening weather and heavy sea; Bar. 29.65.

28th November.—6 A. M. Wind N. E. Noon strong gale with dark threatening weather to the N. E. making all preparation for a gale. Lat. 7° 22′ N., Long. Chro. 88.10., Bar. 29.54, Ther. 81.0. P. M. Wind E. N. E. heavy gale with thick dark weather. 3h.30 P. M. saw the "John Brightman," steering to the Southward. Midnight gale increasing, Bar. 29.45.

29th November.—A. M. gale blowing most furiously, saw a ship running to the Southward. 10 wind N. E. b. E. marked at noon N. E. Bar. 29.14, Ther. 83° No observation, Long. 87° 20'. P. M. furious gale N. N. E. Bar. 29.40. At 11.30 ship in distress and Arab crew

Eleventh Memoir on the Law of Storms in India.

alarmed. Wind at North, bore up at midnight running S. E. and at 3 A. M. on 30th. S. S. E.

30th November .- Running to the S. S. E. 61 knots. 3 A. M. gale at the greatest fury "blowing so hard that it was scarcely possible to hold on;" at 8, a little more moderate; noon moderating fast, but Barometer running low 29.40, Ther. 82°, Lat. indifferent Obs. 7° 22' N., Long. 87° 35' E., having since midnight made 74 miles to the S. S. E. and South. 8 P. M. wind N. N. E., course S. E. 5' per hour; winds marked as variable N., N. E. to S. W. at 7 P. M. when (from 5 P. M. ship had only been going 1.4 knots) remarks are "variable dark cloudy weather and a high cross sea; easterly gale broken, but Barometer very low, 29.31. At 7 P. M. "a heavy Westerly sea rolling up and overpowering the Easterly sea" run from Noon to 8 P. M. S. E. 32 miles: a brig in sight. At 8 P. M. dark gloomy weather with packed masses of clouds to the S. W., vivid lightning. Vessel steering N. E. 23 miles, from 8 to midnight, when a strong breeze from the S. W. and the S. Westerly sea very high, dark threatening weather, vessel running 8 knots to the N. E.

1st December .- A. M. Increasing gale; at 4 A. M. violent and severe gale S. S. W. if possible worse than before. 7, tremendous S. S. W. gale, Bar. 29.30 to 9 A. M. when Bar. on the rise; at 10 A. M. Bar. 29. 45 gale moderating; at 11, 29.55 strong gales from South; Lat. indifferent obs. 9° 55' N. Long. 88° 00' E., Bar. 29.65., Ther. 82., P. M. Wind S. S. W., course N. E. 91 knots, and run 107 miles; to midnight strong gale; 3 P. M. Bar. 29.75. 10 P. M. 29.80. South, midnight moderating and sky clearing.

2d December .- Midnight to noon N. E. 511 miles N. E. b. N. 49 miles. A. M. Wind S. S. E. 6 A. M. S. E. 11 A. M. E. S. E. At noon fine weather; Lat. 11° 17' N., Long. 89° 45', Bar. 29.90, Ther. 83°.

#### The COLONEL BURNEY. Madras.

The barque Colonel Burney, from Moulmein to Bombay passed by Galle on the 10th instant, under jury masts, having lost her main and mizen masts in a heavy gale on the 1st, in Lat. 6° 50' N., Long. 85° 20' E .- Record, Dec. 30.

Extract of a letter from Capt. Durham, of the Barque Col. Burney to his owners dated, 28th December, 1843.

MESSRS. APCAR AND Co.

DEAR SIRS,—I beg to report the arrival of the Col. Burney here yesterday, after a passage of 33 days from Rangoon. I have lost main and mizen-masts by the deck during a heavy gale in Lat. 6° N., Long. 85° E., the vessel was thrown on her beam-ends; to save ship and cargo I cut away my masts, when she righted with 7 feet water in the hold.

Your obedient servant,

(Signed,) R. B. DURHAM.

### Report from KAYTS, Ceylon, forwarded by Capt. BIDEN.

My Dear Captain Biden.—You will no doubt have heard of the gale we have lately experienced down here; and as it was evidently one of the rotatory description I send you an account of it, supposing that any information on this subject will be interesting. It appears to have travelled in a W. S. Westerly direction, the Southern portion of the circle passing over Kayts, Delft island and Paumbum: At Manar, although the weather had a wild appearance, it was not felt at all. I was myself at Paumbum at the time, where I noted the changes closely; but at the other places, the variations may not be so correct: still they are sufficiently so to trace the track of the gale. To begin then with my windward station, Kayts.

It commenced here from the N. W. about noon on the 1st; increasing in violence till 6 p. m. of the 2d, between which and midnight it blew with great fury, accompanied by a very heavy fall of rain. On the morning of the 3d it shifted to W. S. W. strong, and by noon moderated at South.

At Delft island on the 1st the wind which had been moderate all day at N. W. freshened towards evening from the same quarter, and gradually veered round to between W. N. W. and W. by S; at which by 6 A M. on the 2d it was blowing a heavy gale. This continued all that day and night till 11.30 A. M. on the 3d when the wind suddenly

chopped round to S. by W. and moderated by daylight; next morning the wind was from S. S. E. and eventually settled at S. E.

At Paumbum.

1st A. M. Wind fresh at N. W.

P. M. More moderate at N. E.; freshening during the night but fine 2d. A. M. 6 Moderate N. N. W. very cloudy.

10 Freshening and veering to the Westward; Ther 72°; lower than it has ever been before during the last 4 years; noon very fresh at N. W. with confused appearance, scud flying fast and low from North, 3 P. M. fresh, W. by S.

- 6. Ditto W. S. W. Scud still flying from North, but not so fast; heavy bank of rain to N. E. but without any appearance of wind from that quarter.
- 9. Increasing at W. S. W. Midnight, hard gales at W. S. W. with very heavy rain.
- 3d. A. M. 6, Sky a perfect lead colour, gale and rain continuing from same quarter till 3 A.M. when it moderated and P.M. veered to S. S. W. and South; scud now flying to N. E.
- 6. Strong breezes from S. W. to S. S. E. the wind not remaining steady for two consecutive minutes, still thick and hazy with rain.

4th A. M. Fresh South to S. S. E. and hazy.

You will find it easy with these dates to trace the progress of the whirlwind from Kayts to Paumbum, and if it continue in the same course it must coast along the shore of Madura and part of Tinnevelly, going to sea again from the Malabar coast at a little to the North of Cape Comorin; leaving Colombo untouched; a matter to be rejoiced at, as the craft there at this fine season would hardly have been prepared for a blow from any point South of West.

My vessel had a very narrow eşcape, having parted and drifted to within 80 yards of a reef. She lost bowsprit, rudder and boats, had her stern stove in and was otherwise much injured; but fortunately the wind coming round enabled her to get a start off and run round to leeward of the island where I picked her up a sad plight. We are repairing her now and I hope to be at sea again by the end of the week.

BarqueCarena from Ceylon towards Madras, reduced to Civil time.

A long detailed extract of this vessel's log was kindly sent me by Capt. Biden, and it would have been highly interesting from her position between 5° and 13° North Lat., had any Long. accompanied it, but unfortunately there was none. And we are thus reduced to the necessity of saying only that she had,

On the 25th November. - Winds E. to N. W. in Lat. at Noon 4° 58' N.

26th November.—Winds Northerly in 5° 43' N., strong breezes and cloudy.

27th November.—Bar. 28.80., (by Capt. Biden's correction, 29.50.,) No observations, winds apparently N. E. to N. N. E.

28th November :- Wind N. E. by E. to N. N. W. No observations, weather hazy and much rain.

29th November.—N. W. to N. N. E. and again W. N. W.; light winds, cloudy and squally.

30th November.—N. N. W. Westerly and S. S. W. winds. Lat. 6° 57' North.

1st December.—Lat. 9° 51' N. winds Southerly increasing at 4 P. M. to a strong gale obliging the vessel to scud under a reefed fore-sail.

2d. December .- Moderating, Lat. 12° 17' N. P. M. S. E. wind.

Abridged Log of the Brig BITTERN, Captain G. Scott, from the Mauritius to Madras, forwarded by Capt. Biden.

28th November 1843.—1 P.M. Wind W.S.W. fresh breeze and cloudy; 7, Bar. 29.50; at 10 P.M., hard squalls.

29th November.—11 wind S. W. first part strong breezes, middle and latter parts fresh gale, with squally weather and rain. 9 A. M. Bar. 29.35. Noon, fresh gale and cloudy, Lat. Obs. 5° 33' N.

1 P. M. wind S. W. fresh gale and squally; at 4 Bar. 29.24; at 3 wind S. S. W.; at 5 South more moderate but threatening in appearance, made preparation for bad weather; 10 wind S. S. E., 12 squally with small rain.

With this log also no Longitudes are given.

30th November.—At 3 A. M. wind East; at 5, wind E. N. E. squally; at 7 Bar. 29.34; noon, fresh gale and cloudy, Lat. Obs. 8° 23' N.

1 P M. wind E. N. E. fresh gale and cloudy, at 3 wind N. E. by E. at 5 Bar. 29.30, 8 Bar. 29.40. Hard squalls with small rain; 11 wind E. N. E. fresh gale throughout with frequent hard squalls and small rain; under storm trysails.

1st December.—3 A. M. furled the fore topsail, 5 Bar. 29.30, 7 more moderate, 10 wind East, Bar. 29.24. Noon, fresh gale and cloudy, Lat. Obs. 9° 49' N.

l P. M. wind S. E. fresh gale with hard squalls, 5 wind South, 8 hard squalls with small rain, 6 Bar. 29.35, fresh gale throughout with frequent bard squalls and small rain. Midnight Bar. 29.49.

2d December.—2 A. M., wind S. S. E. ver? hard squalls with small rain, 4 Bar. 29.60, 5 more moderate, 11 wind S. E., noon more moderate, Bar. 29.60. Lat. Obs. 11° 21' N. after which fine weather.

Report from the Barque Mary Imric, Captain Boyd, forwarded by Captain Biden.

30th November, 1843.—Blowing a strong breeze from N. N. E. all possible sail set, daylight the weather became very cloudy, heavy dark masses rising in the North and passing over with increasing velocity to the Southward. Noon, weather dismally dark, with a very suspicious appearance, sun obscured, Lat. by account 12° 20' North, p. M., the sea rising and the breeze increasing fast, took in all small sails and sent down royal and top-gallant yards, and close reefed the top-sails, indeed at this time I would, have been induced to lay the vessel to, the appearance of the weather was so bad; as well as being under the impression, that the farther you run into a storm the more likely you are to suffer from its effects\* had the Barometer not kept well up; at daylight it stood at, ... 30 03

At noon it rose to, .. 30 11

2 P. M. down to, .. .. 29 83

where it continued till midnight, at which time it blew a terrific gale with a heavy cross sea, wind steady at N. N. E. and scudding under

<sup>•</sup> This is the old axiom. It depends of course on which side of a storm circle the ship is, to be correct. A ship should certainly never run into a storm, but she may as certainly often run out of it.—H. P.

two close reefed top-sails; I may here add that I never saw the mercury fluctuate so much, although it never fell lower than 29. 60.\*

lst December.—From midnight till daylight, the gale continued with unabated force, with frequent hard squalls and heavy rain, and a dreadful sea cunning, that washed away nearly all the bulwarks, and drowned nearly the whole of the live stock. The sea was uncommonly cross, and evidently produced from other causes, besides the gale we were then in, and had we not taken the precaution to get every thing well secured on deck, as well as made secure aloft, the consequences might have been serious; towards noon the weather cleared away so far as to enable me to measure the sun's altitude, which placed us in 10° 4′ N. Long. 84° 1′ E. p. m. the gale continued with very unsettled weather, wind veering round to the Westward, Bar. 29.60; towards midnight weather tolerably clear overhead, but a dense wild looking haze all round the horizon, Bar. 29.25.

2nd December.—The wind continued to veer to the Westward till 2 a. m. when it fell nearly calm, the weather then looking dismal with continued flashes of vivid lightning and loud peals of thunder, got all the canvas secured as fast as possible, which we had just time to do when the gale burst out from about S. S. W. Fortunately we were prepared for it, and had nothing set but a new small close reefed maintop sail, which we lay to under till noon, Bar. stationary at 29.25. It is impossible for me to describe the sea that we had to contend with. It had been blowing a gale (and no ordinary one,) from N. N. E. round to S. S. W. for the last three days, and every way we looked a mountain of water appeared coming towards us. Shortly after noon the Bar. started up to 29.80, but the gale continued without any abatement till midnight.

3rd December.—The gale began gradually to abate and the Sea to fall; Barometer at daylight up to 29.90.

Abridged Log of the Ship FYZUL CURREEM, Captain J. BALLANTINE, from Calcutta towards the Mauritius, reduced to civil time.

<sup>26</sup>th November, 1843.—Noon, fine breeze N. and cloudy, Lat. 7° 50' N. Long. 83° 59' E., course South, 7 knots per hour. P. M. and to midnight squally. Wind steady at North and N. by E.

<sup>\*</sup> These fluctuations are highly interesting particularly when limits are given .- H. P.

27th November.—A. M. to 9; Wind about North; 10 to Noon N.N.W. squally; noon Lat. 5° 11' N. Long. 83° 36' E., 9 P. M. heavy squalls, wind and rain from N. N. W. to midnight.

28th November—A. M. to noon, fresh breeze, &c. tolerably clear; wind varying N. N. W. to N. W. b N., 8.30 A. M. an English bark standing to the Northward and Eastward. Noon Lat. 2° 6′ N. Long. 83° 40½ E.; by 8 P.M. increasing to fresh gale W. b S.; to midnight course South, 8 knots throughout.

29th November.—A. M. fresh gale West increasing with heavy squalls to a strong gale and sea by noon, when Lat. 00° 54′ S., Long. 84° 30¼′ E., Current of about 24 miles to the Eastward. P. M. Gale continuing and increasing at times, to midnight, wind strong at West and course South 7 and 8 per hour.

30th November.—8 A. M. more moderate, noon fresh gales. Wind steady at West throughout. Lat. account 3° 50′ S., Long. 85° 27′ E. Current of 21 to the Eastward. P. M. more moderate and clear, wind West; and at 7 P. M. W. 3 S., midnight moderate and clear, a strong sea from the W. S. W.

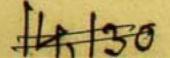
lst December.—A. M. a little squally; by 10 A. M. wind at N. N. W. light 3 knot breeze; noon fine, Lat. 5° 39' S. Long. 85° 37\forall' E. Current and sea estimated by Captain Ballantine at 29' to the E. N. E. a strong sea from the W. S. W. P. M. winds N. N. W., and at 9 N. W. and fine to midnight.

2d December—A. M. to noon, light N. N. E. winds with a heavy head sea. (Ship steering S. W. by S.) Lat. 6° #1' S. Long. 85°003' E. no current, but the sea has retarded the ship's progress 10 miles.

MAURITIUS SHIP NEWS from the Englishman.

We are indebted to Captain Renaut of the Ship Active, for the following details respecting the hurricane which he experienced on the 30th November. On the 24th November, the weather was very tempestuous, blowing from the S. W. and veering round to the N. W. then N. E. and finally settled at E. on the 30th, and blew a perfect hurricane for 48 hours in Lat. 10° 23′ S. and Long. 85° 17′ E. The gale abated on the 2nd December in Lat. 13° 58′ S. and Long. 13° 31′ E. The Ship sustained the loss of a few sails and a quarter boat; but fortunately none of the coolie passengers on board sustained any injury.

P27946



The Bark Ward, Chapman, from Bombay, reports having experienced a hurricane in Lat. 12° 30′ S. and Long. 84° 30′ E. commencing on the 30th November from S. W. and blowing right round the compass. It abated however on the 3rd December, Lat. 14° S. and Long. 79° 30′ E; she lost a few sails.

Abridged Log of the Barque Flowers of Ugie, Captain Annand, from Madras to the Mauritius, reduced to civil time.

24th November, 1843.—The Log worked back from 25th, gives for this day, Lat. 4° 57', Long. 84° 33' E. with light Southerly and S. S. W. airs and breezes, from noon to midnight.

25th November.—A. M. heavy squalls and rain, wind S. and S. b. W. to noon when strong gale about S. S. W. Lat. 5° 36′ S. Long. 85° 27′ E., Bar. 29.80, Ther. 81° high cross sea. P. M. to midnight strong gale S. W. by S. with squalls and rain; preparing for bad weather. Midnight Bar. 29.68.

26th November.—To Noon gale increasing from S. W. Lat. 6° 5' S. Long. 86° 21' E., Bar. 29.62, Ther. 81°. P. M. increasing and S. W. b. W. 6 P. M. hove to under bare poles. Heavy sea running, midnight the same.

27th November.—4 A. M. weather a little clearer, noon heavy gales Lat. 6° 20' S. Long. 88° 4' E., Bar. 29.57, Ther. 83°. Easterly current of 60' since noon of the 26th. P. M. wind W. N. W. At 10 N. W. to midnight.

28th November.—4 A. M. wind hauling to the North, being N. N. W., at 2 A. M., when the ship bore up and ran 27' to the S. W. by S. when hove to again, having sprung the fore-topmast in rolling. Noon wind about N. N. W. Lat. Obs. 7° 41' S. Long, 88° 49' E., Bar. 29.63. Ther. 84°. P. M. wind North. Strong gales and heavy sea to midnight.

29th November.—A. M. apparently, moderating, noon strong gales Lat. 8° 46′ S., Long. 87° 40′ E., Bar. 29.67, Ther. 83°. 10 A. M. bore up and steered S. W. b S., P. M. strong gale N. N. E. Ship running to the S. W. b. S. to midnight. Bar. at 4 P. M. 29:66 and wind at 10 P. M. N. E., midnight strong gales and Bar. 29.69.

30th November.—At 8 A.M. wind N.E.b E., strong gale heavy squalls, turbulent sea, and Bar. falling, 9 A.M. hove to again, hav-



ing since 10 A. M. on the 29th, ran 158 miles to the S. W. b. S., noon heavy gale, Lat, 10° 52′ S., Long. 86° 24′ E. Bar. 29.59. Ther. 83°. P. M. wind N. E. Strong gales, heavy squalls and a dark cloudy appearance all round in the sky. 2 P. M. Bar. 29.58. At 10 P. M. Bar. 29.53. Gale very heavy; at midnight Bar. 29.49.

1st December:—2 A. M. wind E. N. E. 8 A. M. abating a little, 10:30 bore up again to S. W. Noon strong gales Lat. 11° 2′ S., Long. 86° 6′., Bar. 29.50, Ther. 84°. P. M. Wind N. E. b E., 4 P. M. Bar. rising, midnight strong gales and heavy equalls, ship running to the S. W.

2nd December.—4 A. M. to noon moderating; 10 A. M. Wind N. E. ship steering to S. W. Noon clearing away, Lat. 13° 20′ S. Long. 83° 49′ East. Bar. 29.83, Ther. 86°. P. M. fine E. N. E. breeze to midnight.

3rd December.—Noon fine, lat. 14° 22' S. Long. 81° 15' E., Bar. 29.87, Ther. 85°.

Abridged Log of the Ship John Fleming, Capt. Clerk, from Calcutta bound to Mauritius, reduced to civil time. N. B. Some additions made from a letter of Capt. Clerk's forwarded by Captain Biden.

21st November 1843.—The weather, from calm and cloudy with light airs on the 20th and 21st, is at 5 p. m. on the 21st marked as "heavy cloudy weather in the North West."

22d November.—At 5 A. M. the wind became steady at W. S. W. At noon fine and cloudy, Lat. 00° 30' North, Long. 82° 29' E. P. M. to midnight wind about S. W. ship running to S. E. and S. b. E. 7 and 8 knots.

23d November.—A. M. squally; at 8 A. M. wind West, 8 knot breeze, course South. Noon strong breeze and cloudy, Lat. 2° 15' S. Long. 83° 30' E. Ther. 82°, Bar. 29.72. P. M. wind W. b N. and at 5 W. S. W., midnight heavy cloudy weather.

24th November.—A. M. increasing, noon under close reefs, strong gale W. S. W. and thick weather with rain, Lat, 4° 47′, Long. 84° 30′ E. P. M. to midnight wind W. b S. hard squalls, strong gale and heavy sea. Course to the S. and S. S. E. 5 knots.

25th November.—A. M. moderating a little, high head sea, noon Lat. 5° 1' S., Long. 85° 31' E., Bar. 29.70., Ther. 78° P. M. wind W. S. W. more moderate; to midnight heavy head sea continues.

26th November.—A. M. to noon wind W. S. W. At noon every appearance of a gale, Lat. 5° 58' S. Long. 86° 24' E., P. M. wind marked S. W. b. W. blowing very hard; Bar. falling to 29.50, lying to under storm staysails, head to the S., midnight blowing excessively hard.

27th November. — A. M. Sea increasing; at noon Lat. 6° 26' S., Long. 87° 10', Bar. 29.50. Ther. 80°, P. M. Bar. 29.40, heavy gale (apparently from N. W. or W. N. W. \*) continues till midnight.

28th November.—A. M. wind drawing to N. W. (ship coming up to W. S. W.) Noon more moderate, Lat. 7° 7' S. Long. 87° 24' E., Bar. 29.50, Ther. 80°. P. M. wind marked N. N. W. gale continuing; very irregular sea. At 8 P. M. wind had veered to N. E., ship running S. W. b S. and S. W. 98 miles from 11 A. M. to midnight when strong gale.

29th November.—A. M. Increasing to a hurricane about N.E.; noon Bar. 29.00, Ther. 79°, Sympiesometer 28.9, ship on her beam ends. Lat. 8° 47′, Long. 86° 20′. P. M. Hurricane between North and East, head to N. N. W., Bar. broke; oil disappeared in the Simp. At midnight ship buried in the sea and half swamped.

30th November.—A. M. Cut away the top masts which relieved her a little; boats blown into the rigging and over the poop, at 4 blowing a hurricane still between Nerth and East.

1st December.—To noon still blowing a heavy gale; Sympiesometer 28.4. at noon, oil having re-appeared; at 5 A. M. set a storm staysail, moderating to midnight.

2d December.—To noon moderating, wind not marked, Lat. obs. 14° 5' Long. 79° 29'; 7 p. m. wind marked N. E. At midnight fine.

\* Nothing is marked in the Log, but it is clear that the wind must have been to the Northward of West, at least since midnight, by the Lat. for lying to under storm staysail, with a gale from S. W. b W. the ship must have been making northing at least from noon to nearly midnight, when if we suppose the gale to have drawn to the Northward of West she may in the 12 hours to noon of the 27th have drifted back and made the most part of the 41 miles of Lat. which appear on the log to noon of the 28th; for it was only one hour before that time that she bore up.



Abridged Log of the Barque ELIZABETH AINSLIE, Captain T. LYS-TER, from Madra's to the Mauritius, reduced to Civil time.

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23rd. November, 1843.—Noon, Lat. Obs. 3° 5' S. Long. 84° 3' Bar 29.80. Ther. 82°. During the preceding 24h had run 5 to 7 knots to the S. b. E. with winds varying from to S. W. b. W., wind W. b. S. to 8 A.\*M. when W. to noon, fresh breeze and latterly squally. P. M. the wind W. to midnight.

24th November.—Wind W. b. S. to 8 A. M. and W. to noon, when Lat. 5° 10′ S., Long. 84° 25′ E., Bar. 29.78. Ther. 79°. P. M. fresh breeze and squally wind W. to midnight.

25th. November.—To 5 A. M. Wind S. W. and to noon, S. S. W. and high swell from the Southward, Lat. Obs. 5° 41' S. Long. 85° 50' E. Bar. 29.78. Ther. 80° P. M. fresh gale increasing from S. W. b. S. and S. W., at 11 P. M. W. S. W.

26th November.—A. M. fresh gale W. S. W. to noon, and high sea from the Southward; noon Lat. 6° 36′ S. Long. 86° 53.′ E. P. M. hard gales and heavy squalls W. S. W. hove to till midnight head N. N. W. when more moderate.

27th. November.—Made sail to the Southward, and to noon ran 62 miles to the S. b. W. Winds I a. m. W. N. W.; 7 a. m. W. b. N.; at 10, W. N. W. fresh gales and cloudy with drizzling rain and high sea; noon Lat. Obs. 6° 27' S. Long. account 87° 22' E. Bar. 29.60. Ther. 80°. I P. M. wind N. W., 6 P. M. N. N. W. 10 P. M. North; midnight N. N. E.

28th November.—3 A. M. Hard gale from N. E. with heavy squalls; 4, hove to under close reefed main-top-sail, Bar. 29. 30; noon tremendous sea, Lat. acct. 8° 21' S. Long. 87° 02' E. Bar. 29.5. Ther. 80°. To 5 P. M. wind E. N. E.; 6 P. M. East. At 5 P. M. Main-top-sail blown to pieces and ship labouring greatly, set the reefed fore-sail and kept the ship before the wind. At 6 P. M. fore-sail blown out of the bolt ropes, broached to with head to the N. N. W. midnight, gale blowing with great violence, and tremendous high sea.

29th November.—5 A. M. A sudden lull and high confused sea. 7 A. M. commenced blowing from the North; noon, heavy thick cloudy weather all round, with a high confused sea, hard puffs and lulls at times, Bar. 29.00, Ther. 77°. At 1 P. M. wind S. E.; at 6, to 8, North; at 9, N. N. W.; at 12, North, heavy puffs, and lulls with a high sea. Bar. 29.00.

30th November.—Wind North to noon, at 2 a. m. Bar. 28.90. At 4, Bar. 28.80.; at day-light blowing very hard with tremendous gusts at times. Noon, Bar. 28.80, Ther. 78°; lying to with ship's head to the West. P. M. commenced a perfect hurricane, ship on her beam ends, and expecting masts to go at every moment, every thing ready to cut away. 4 P. M. Bar. 28.90.; 6 P. M. still blowing violently. 7, wind North, the furled main-sail blown from the gaskets. 8, Bar. 28.90, wind N. N. E. Midnight, weather the same, Bar. 29.00. lying to, head West to W. N. W.

lst December.—Daylight inclined to moderate, wind from N. N. E., to noon Bar. 29.10, head N. W.; noon, heavy puffs and lulls with thick cloudy weather, and much rain, Bar. 29.20. Ther. 78°. At 6 P. M. Bar. 29.30. At 8. P. M. Bar. 29.35., midnight 29.45. P. M. wind N. E.

2d December.—6 A. M. Bar. 29.50., noon 29.70. making sail; Lat. 12° 34′ S. Long. 81° 55′ E., pleasant breeze N. E.; 4 P. M. E. N. E., 9 P. M. N. E.

3d December.-Noon, Lat. 14°. 6' S. Long. 80°. 53' E. Fine weather.

Abridged Log of the Ship Edmonstone, Capt. MacDougal, from Calcutta bound to Mauritius, reduced to Civil time.

25th November.—At noon in Lat. 6° 15' S. Long. 82° 30' E., P. M. Winds variable from the S. W. to S. S. E.; to midnight, light breezes and cloudy.

26th November.—Steady light breeze to noon from S. S. W., no observation, Lat. account 6° 42' S. Long. account 83° 06' E. P. M. to midnight, winds S. S. W. to South, brisk breeze.

27th November.—A. M. strong breeze about South, with hard squalls and turbulent sea. Lat. Obs. 6° 58' S. Long. 83° 36' E., P. M. variable strong breezes from the Southward with hard squalls. Midnight "strong gale."

28th November.— A. M. strong gale and mountainous sea. Wind about S. S. W. Noon, Lat. Obs. 6° 50' S. Long. 84° 04' E. P. M. wind S. W.; gale increasing to midnight.

29th November.—2 A. M. wind W. S. W. severe gale; 9. A. M. hove to under reefed try-sail, wind West, no observation; Lat. account 7° 12′ S. Long. 85° 02′ E. P. M. "violent gale W. b. S.," heavy cross sea.

8 р. м. "wind hauled to W. N. W. and moderated, Bar. rising; 10 р. м. W. N. W. made sail and stood to the S. S. E. 9' till midnight.

30th November.—3 A. M. wind N. W.; at 6, N. N. W. Daylight, gale increasing, and Bar. falling; to noon, severe gale N. N. W. with furious gusts, Lat. account 9°3′S. Long. account 85°4′. E. 9 P. M. wind N. N. W. severe gale and high cross sea; at 8, wind N. b. E. to midnight, when Bar. rising a little.

1st December.—By 9 A. M. strong gales N. E., to noon Lat. by account 11° 15' S. Long. account 84° 22' E. R. M. the same, wind N. E. to midnight; carried away chain plates and hove to; midnight more moderate.

2d December.—A. M. moderating to noon; wind N. E. to 9 A. M. and North to noon, when Lat. 12° 23' S. Long. 84° 30' E. P. M. wind N. E., moderate breeze and heavy cross sea...

3d December.—Noon, Lat. 13° 51' S., heavy sea still continuing, wind E. N. E. and fine.

Note.—Captain MacDougal informs me that during the storm, his Bar. was at 29.38 and the Symp. at 29°28' the lowest, the Ther. steady at 72° throughout the gale.

The Lat. and Long. given, are partly from the chart, and partly from account worked either forward or backward to the nearest day of observation, Captain McDougal observes that having 220 emigrant coolies on board, he was obliged, during the height of the storm, to steer various courses to obtain for them as much comfort and safety as the weather would allow of, so that he can only give me limits within which he thinks the vessel's position must have been.

The log gives as nearly as can be ascertained, a current of 149 miles to the South and 116 miles to the West, but it is necessarily very imperfect, and the set of the storm wave and current on one day was doubtless counteracted, in some degree, by that on a different part of the storm circle on another.

Abridged Log of the Barque Baboo, Captain Stuart, from Madras to Mauritius, reduced to Civil time.

26th November, 1843.—At Noon, Lat. 6° 17' S. Long. about 83° 40' E., wind S. W. b. S., ship steering to the S. E. b. S. 4½ knots, squally and rain. Spoke the Tartar 7 days from Ceylon. Midnight, wind S. S. W.

27th. November—A. M. to Noon strong breeze and cloudy; no Obs.; P. M. fresh gale S. S. W., 6 P. M. South, course E. S. E. Midnight heavy squalls and rain.

28th. Nov.—A. M. Heavy squalls and rain continuing, wind from S. to S. W., course S. E. to S. S. E. Noon Lat. 7° 8′ S. Long. 85° 10′ E., heavy gales S. W. b. W. and sea. P. M. Wind W. S. W. at 6 and to midnight when strong gales and rain; course marked as S. b. E. to S. b. W. In the Newspaper report Captain Stuart states this to be the day on which the wind became very tempestuous.

29th. Nov.—A. M. Strong gales continuing W. S. W. and at 6 A. M. this day, course S. S. W. Noon heavy gales throughout. P. M. increasing, wind marked N. W. Course S. W. and at midnight S. b. W,

30th. Nov.—Daylight heavy squalls and rain N. W. Course S. W., 7 knots. Noon. Lat. 9° 2′ S. Long. 85° 9′ E. strong gale. P. M. wind N. W. Midnight heavy squalls and rain.

1st December.—Wind, N. W. to noon; course S. W. b. S. and S. W. Lat. 11° 0′ S. P. M. heavy gale N. N. W. Course, 7½ knots to S. W. and at 6 P. M. to W. S. W. Heavy gale and rain; midnight increasing.

2d. December.—Wind and weather as before, course W. S. W. 7½; Noon, no observation. P. M. wind marked Easterly, course W. b. S. Heavy gale and squalls to midnight.

3d. December.—Wind Easterly, course W. b. S. 7½ knots. Noon, heavy gale, no observation. P. M. wind Easterly, course W. S. W. 6 P. M. wind N. E. Hove to at 8 P. M.

4th. December.—Mizen top-mast went, lost main-yard and sprung main-mast, ship labouring as if in broken water on a reef. No observation. P. M. fresh gale and fine, wind E. N. E. lying to; midnight moderate and fine.

5th. December. -- 6 A. M. bore up to the W. by S. Wind Easterly, noon Lat. Obs. 18° 6' S. Fine weather.

Abridged Log of the Ship Sophia, Capt. Andrew, from Bombay towards the Mauritius, civil time.

On the 22d November.—At noon the Sophia was in Lat. 4° 53'. S. Long. 79° 54' E. standing till midnight to the S. S. E. with a moderate breeze from the S. Westward, squally weather.



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23d November.—Threatening dark weather and puffy, to noon, when Lat. 5° 54' S. Long. 80° 30' E. P. M. to midnight, strong breeze and cloudy; ship standing to the E. S. E. and E., wind S. S. Westerly, throughout heavy head swell; midnight more moderate.

24th November.—At 4: 30 A. M. a heavy squall and shift of wind from S. S. E. to W. N. W. when a strong breeze and heavy head sea, ship standing to the S. E.; noon Lat. account 6° 30′ S. Long. 81° 20′ E. P. M. wind S. W. b. S.; midnight squally and calm.

25th November.—Throughout variable, squally and calm; noon Lat. Obs. 5° 50′ S. Long 81° 49′. E. Midnight moderate and squally weather.

26th November.—Moderate S. S. W. breeze to noon, when Lat. Obs. 6° 24' S. Long. 82° 53' E. 6 A. M. saw the bark Ward, Chapman, from Bombay; 8 P. M. wind S. fresh breeze and cloudy, ship standing to the West and W. b. N.

27th November.—Wind South to noon. Standing S. E. b. E. to 8 A. M. when W. b. N. for 2 hours and again S. E. b. E., strong breezes and a heavy, S. E. swell; noon Lat. Obs. 6° 36' S. Long. not given; P. M. to midnight hard squalls.

28th November.—Wind from S. b. E. to S. S. W. of variable strength, and with thick weather, noon Lat. 6° 23′ S. Long. 81° 34′ E. P. M. increasing with a heavy head sea from the Southward from 3 P. M. to midnight, wind S. W. and S. W. b. W.

29th November.—Wind S. W. b. W. to S. S. W. to noon strong breeze and high head sea. Lat. noon 6° 48′ S. Long. 82° 00′ E. P. M. increasing in puffs Westerly and W. N. W. "very dirty appearance all round the horizon."

30th November.—Wind N. W. throughout, A. M. increasing to a gale with tremendous puffs at intervals; daylight heavy gale; noon hard gale, no observation; P. M. heavy sea in all directions; ship lying to, up S. W. off S. S. W. I and 2 knots.

lst December.—A. M. heavy gales and a fearful sea running in all directions, lying to under a close reefed main-top-sail and fore-sail. 6 A. M. moderating a little. Wind marked N. W. throughout, no observation; P. M. still moderating. Midnight heavy sea running from the S. Westward; wind veering a little to the Northward apparently.

2d December.—A. M. wind marked North, fresh breeze and cloudy with cross sea; noon Lat. 9°56'S. and Long. 81.48' E., wind and weather the same to midnight.

3d December.—Wind marked N. N. E. to midnight, and fine weather; noon Lat. 11° 7' S. Long. 80°49' E.

Abridged Log of the Ship FUTTLE ROZACK, Captain RUNDLE, from Calcutta to Mauritius, civil time.

This very able, careful, and really scientific log, which reflects the highest credit on Captain Rundle, was kindly placed at my disposal by him, being his private one. Every nautical and scientific man will I am sure join with me in wishing we had many such observers affoat, and access to their observations. I need not say that with the necessary abridgment as to mandeuvres and private matters, I have as nearly as possible preserved Captain Rundle's expressions.—H P.

On the 20th November, 1843.—The Futtle Rozack, at noon was in Lat. 0°39' N. Long. by 2. Chrs. 82° 30' E. and Bar. 29.93. Ther, 78° Winds variable between W. S. W. and S. W. with light fine weather; at 8 P. M. a fresh breeze and squalls, sun-set very fiery, Bar. is high. At midnight squalls less frequent, course S. a little Easterly.

21st November .- 1 A. M. to 4, strong breeze smart squalls and torrents of rain. Noon, pleasant weather, Lat. Obs. 1° 22' S. Long. 83° 10' E. Bar. 6 A. M. 29.93. Ther. 79°; noon Bar. 29.93. Ther. 82°, winds , A. M. S. W. to W. N. W. and at times South. P. M. moderate breeze and passing squalls; a long Southerly swell just perceptible, clouds A. M spherical cumuli and nimbus. P. M. cumuli and dark nimbi; wind P. M. West and W. N. W. and N. W. in the squalls; P. M. Bar. 5 P. M. 29.93. Ther. 80°, at 11 P. M. Bar. 29.03. and Ther. 80°. At 9 р. м. Capt. R. remarks, " I observed those modifications of lightning more like the Aurora Borealis which I have seen in the North sea, or rather more like the Aurora Australis which I have seen off Van-Dieman's Land and New Zealand. I have never seen it in low Lats. but as a precursor of strong weather. It gradually lightens up the western horizon with a sudden dark red glare, and thus flickers about for a few seconds and gradually disappears. Bar. is still high. The stars too have a very sickly appearance, and a peculiar

<sup>\*</sup> As corrected by comparison with the Standard at Calcutta .- H.P.

dancing motion. I thought at first my eyes deceived me, but my mates observed the same; I suppose occasioned by some dense vapour."

22d November.—A. M. wind marked S. S. W. to West; course from 3 to 7 knots to the Southward. Squally, making preparations for bad weather. Noon, Lat. Obs. 3° 18' S. Long. Chr. 83° 22' E. Lunars 83° 10' E. Current for the last 24 hours S. E. b. E. 26'. Clouds A. M. cumulo stratus with flying nimbus, Bar. 1 A. M. 29.93. Ther. 79°; 6 A. M. 29° 93' and 78°; noon 29° 88' and 82°.

P. M. Squally, winds West to W. b. N. 4 P. M. scud flying swiftly to the Southward, 8 P. M. observed many phosphoric flashes in the sea, the luminous space from one flash as large as the cutter; running 6 and 7 knots to S. b. W.; midnight fresh breeze. Bar. 9 P. M. 29.91, Ther. 80°; at 10 P. M. the same clouds P. M. at intervals lofty cirrhi, then again obscured, a nimbus and light scud flying to the South above all.

23d November.—A. M. to noon, winds West to S. W. 6 and 7 knots, breeze to noon, when Lat. 5° 22′ S. Long. 83° 53′ E., current 59′ N. E. b. E. for the last 24h. Bar. A. M. 29.70. Ther. 76°; at 8 A. M. 29° 50′ and 77°; at 10 p. M. 29.53 and 78°. Noon 29.46 and 80, clouds hemispherical cumuli interspersed with ponderous nimbi.

Capt. R.—remarks. "I find Bar. considerably fallen with an exceeding long swell from the Southward, and at 7 a high N. N. W. sea meeting the Southerly swell created an exceedingly turbulent sea. In the squalls the sea has a strange appearance, the two seas dashing their crests against each other shoot up to a surprising height and being caught by the West wind, it is driven in dense foam as high as our tops. The whole horizon has the appearance of ponderous breakers.

At 8, Bar. still falling; has there been a gale? Much electricity by the appearance of the clouds. Current 59 miles N. E. b. E. 1 E. this 24h. P. M. breeze decreasing to 11 knots, winds West to South and at times calm. Clouds, strata and nimbi, making preparations for bad weather, appearances being suspicious, 11. 30 P. M. Lat. by Aldebaran 5° 37′ S., midnight squally, rain and calms, dark dismal appearances all round and increasing Southerly swell.

24th November.—Dark and gloomy winds variable from S. E. to S. W., Noon, Lat. 5° 32′ S., Long. 84° 49′ E., Bar. 5 A. M. 29.57. Ther. 77°. At 9, 29.63 and 78°, at noon, 29.64. and 80°. Clouds, low strata and nimbus. Currents apparently 30 miles N. E. b. E. § E. for the last 24h.

P. M. A French and English barque in company, the English we supposed the Baboo, Capt. R. remarks "I do not like this gloomy weather; with wind lulling and then coming on again with a warning noise \* there either has been or will be bad weather. At 4 calm, at 5 severe squalls from S. S. W. tremendous high sea from the Southward, ship rolling dreadfully at intervals. Bar. at 4 P. M. 29.63, at 8 P. M. 29.63. clouds marked as very low, scudding stratus to the Southward.

25th November .- A. M. wind South veering to S. W. "and vice versa," strong gusts from S. to S. W. with a high cross sea, occasioned by a short Northerly sea meeting the long South swell. Noon, strong gale at intervals, but decreases as the wind hauls to S. W. increasing to Southward, ship under close reefed main-top-sail and fore-sail Lat. 5° 42' S., Long. 85° 3' E standing to the E. S. E., a current N. W. 71 W. 27 miles in 24b. Bar. at 6 A. M. 29.64, Ther. 76°; 9 A. M. 29.64 and 78°, noon 29.63 and 80°. Clouds marked as low stratus, at times scudding to the South, at times stationary, then flying to the N. E.

P. M. strong gales S. W. b. S. mostly from S. W. attended with violent squalls. The rain water exceedingly cold, the sea water very warm, much more so than usually. Two Barques still in sight a head 5 P. M. mountainous sea from the Southward. Lofty scud above the lower strata of clouds flying quickly to the Southward at 7, breaks in the clouds, stars visible, but very dull. Bar. at 6 P. M. 29.62, Ther. 77°. At 10, 29.61. and 77°. Midnight wind in severe gusts succeeded by lulls of a few minutes duration. Clouds, low stratus not perhaps at 100 yards height, flying before the wind, breaks at times in the clouds, stars visible, with lofty scud flying with inconceivable rapidity to the Southward.

26th November .- A. M. Laid to under close reefed main-top-sail. Wind S. to S. W. squalls with rain, exceeding turbulent sea, noon Lat. 5°. 30' S. Long. 86°. 23'. E., Bar. 6 A. M. 29. 62, Ther. 78°; at noon 29.63, and 80°, clouds very low stratus with lofty scud above all flying to Southward, nimbus at intervals. Strong set to N. E. b E. 65 miles for the last 24th. P. M. fresh gale with furious squalls

<sup>\*</sup> This warning noise I have more than once adverted to as certainly heard also on shore; see Jour As. Soc. 7th memoir Vol. XI, p. 1000. but it might there be supposed to arise from local causes. It is curious to find it remarked at sea by such an attentive observer. What can it be occasioned by? See remarks in summary.

and rain as cold as ice. Edging away to E. S. E. and S. E. b. E. under two close reefed top-sails, wind S. W. and at intervals W. S. W. and West. At 8, ropes and gear on deck brilliantly spangled by small luminous sparks from the sea which when examined appeared to be fragments of Medusæ. Again visible to the W. S. Westward the sullen red glare and flickering lightning; midnight squally, sea presenting flashes of phosphoric light in all directions, Bar. at 9 P. M. 29.63, Ther. 78°, clouds low stratus and ponderous nimbi.

Noon; very high sea; at 1, wind shifted from W. S. W. to N. W. creating a tremendous sea; 10 A. M. struck by a heavy sea which laid the ship on her beam ends, lost main-top-mast; scudded before the wind to the S. E. under barepoles. A. M. Bar. falling rapidly, noon Lat. by D. R. 6° 38′ S., Long. 86° 53′ E., Bar. 5½ A. M. 29.63. and Ther. 79°. at 7h. Bar. 29.62; at 9h. 29.57; at 10h. 29.53; at 10½h. 29.50; at 11h. 29.47; at 11½ 29.44; at noon, 29.43 and Ther. 80°, clouds throughout exceeding low stratus.

P. M. Wind N. W. to 10 P. M. when North; course S. E. to 10, and then South; 3 feet water in the hold and most of the crew sick; vessel making only 4 knots per hour before the wind and labouring excessively. At 6 Bar. rising very fast, and at midnight falling again with dark gloomy threatening weather all round. Bar. at 2 P.M. 29. 46, Ther. 81°; at 4h. Bar. 29. 47; at 5h. 29. 56; at 6h. 29. 62; at 7h. 29. 63, and Ther. 79°; at 9h. 29. 61; at 9½h. 29. 58; at 10½h. 29. 62; at 11h. 29.50; at midnight 29.49. Ther. 77°, clouds, exceeding low stratus.

28th November.—Wind N. E. the whole 24h. A. M. increasing gale, wind veering suddenly to N. E., in a furious squall, lost fore-top-mast, ship lying to in much distress, Bar. 29.47 at l A. M. Ther. 79°; 2 A. M. 29.45; 5 A. M. 29.44; at 6h. 29.43. Ther. 80°; at 11h. 29.45 Ther. 81°, noon 29.49 and 82°. Lat. D. R. 7° 39′ S. double Alt. 7° 47′ Long. 87° 17′ E., clouds low stratus with ponderous nimbi.

p. M. wind N. E. tremendous squalls blowing with inconceivable fury. The sea rising in huge pyramids yet having no velocity but rising and falling like a boiling cauldron. I have never seen the like before, I was in the height of the terrible hurricane of September 1834, in the West Indies, I have been in a tyfoon in the China sea, in gales off Cape Horn, the Cape of Good Hope and New Holland, but

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never saw such a confused and strange sea, I have seen much higher seas, and I am sure wind heavier but then the sea was regular and the wind steadier.\*

10 P. M. dreadful squalls and a confused sea, both cutters washed away and mizen-topmast carried away, blowing still harder but Bar. rising; midnight tried to set the fore-sail and scud but it was blown to pieces clouds low stratus and nimbus; Bar. 2 P. M. 29.49. Ther. 82°; at 5h. 29. 5 and 80°; at 10h. 29. 53; at 11h 29. 54; at midnight 29.56 and 79°.

29th November.—A. M. wind N. E. till noon, still blowing fearfully at times. Again tried to scud and ran S. by W. 58 miles to noon, Bar. steadily rising, 10 A. M. good sight for Chr, 2 A. M. Bar. 29.57; at 7h. 29.57. and Ther. 79°; at 10h. 29.58. and 80°; at noon 29.59. and 81°. Lat. 9° 47′ S. Long. 87° 18′.

Noon blowing with inconceivable fury at times, with the sea I think more agitated and confused than ever; rising up in monstrous heaps and falling down again without running in any direction. Noon laid to again.

P. M. violent squalls and tremendous high sea, 3 feet water in the hold, wind N. E. to East. Midnight more moderate at times. Bar. 2 P. M. 29.60, Ther. 82°, and to midnight the same, but Ther. 79° clouds during this 24h. are exceeding low stratus sendding in all disrections, upper strata to the Southward, lower to the west; at other times apparently to North and East.

30th November.—A. Me gale abates a little, high sea, ship lying to with tarpaulins in the mizen rigging, wind marked N. E. to East. Bar. 4 A. M. 29.60, Ther. 77°. Noon 29.61. Ther. 80°, Lat. 10° 55′ S. Obs. 10° 48′ S. by double altitudes Long. 86° 46′ E. Clouds low stratus.

P. M. moderate gale at times but the sea does not go down; at 4, heavy rain, wind N. E. throughout, midnight the same weather; heavy squalls of rain. Bar. 1 P. M. 29.61. Ther. 81°; at 6h. 29.61. and 78°; midnight clouds low stratus with nimbi.

This is by far the clearest, most graphic and seaman-like description of "the pyramidal sea" found at, or near, the centre of Indian Hurricanes and to which I have frequently alluded in former memcirs, which I have yet met with.



1st. December.—A. M. gale and sea moderating. Winds N. E. to noon when Lat. 11°. 10′. S. Long. 85°47′ E. Bar. 6 A. M. 29.61. Ther. 77°. Noon 29.62. Ther. 81° Clouds cirro-stratus and nimbi. P. M. squalls of rain at intervals, wind N. E. to midnight. 6 P. M. Bar. 29.63, Ther. 80°; midnight 29.64. and 78°; clouds cirro-stratus and ponderous nimbi.

2d December.—Moderate and passing squalls, sea much gone down, repairing damages. Winds East to noon when Lat. 12° 30' Long. Lunars 85° 26' E. Chro. 85° 34'. Bar. noon 29.67.

3d December .- At noon quite fine.

1845.7

Abridged extract from the Log of the Barque Wellington, forwarded by Captain Biden, Civil time.

30th November, 1843.—At noon in Lat. 13° 37' S., Long. 84° 7' E. Bar. 29.68. Ther. 82°. Wind marked E. S. E. Increasing to 2 P. M. when hove to, having prepared for bad weather.

1st December.—Wind marked East; gale increasing, noon Lat. 13° 25' S., Long. 83° 47' E., Bar. 29. 58. at midnight and noon, Ther. 82°, sea increasing.

2d December.—Heavy gale N. E. 9 A. M. saw a Barque scudding under reefed fore-sail. Noon Lat. 13° 5′ S., Long. 83° 27′ E., more moderate, 6 A. M. Bar. 29.58.; at 10, 29. 70., Noon 29.77. Sail made gradually.

3d December.—Noon, N. E. light breeze and rainy, Lat. 12° 34' S., Long. 84° 34' E. Bar. 29.90. Ther. 71.

Extract from the Log Book of the Ship TRUE BRITON, from London to Madras.—Capt. C. C. Consitt.

Friday 1st December 1843.—P. M. Wind E. by S. commenced with a hard gale with occasional tremendous squalls with hail and rain. 8, wind increasing to a hurricane nearly, with a tremendous heavy sea, striking the ship severely, washing away the quarter galleries, above and below, and loosening the stern frame, causing the water to come in there rapidly and obliging us to keep a strong gang of hands in the lower after Cabins bailing continually, the lower deck completely afloat fore and aft, ship's sides and water-ways leaking

much, washed in and unshipped Larboard Cutter; daylight, found one of the shrouds of the main rigging carried away and the wedges round both fore-mast and bowsprit worked right out; blowing heavily at East with tremendous squalls and rain. Ship lurching and rolling heavily and shipping much water over all. The lower deck completely aftoat, the water washing over the combings. No Observations.

Bar. ranging from 29.50. to 29. 60., Simp. from 29.2 to 29: 10, throughout the gale the Ther. 83°.

Saturday 2d December, 1844.—P. M. Wind E. by S. Hard gale with heavy squalls, rain and hail and a tremendous sea on; ship being struck very heavily about the stern frame and under the Larboard main channels, the quarter galleries completely gone, the quarter deck and waist ports stove and washed out, the sea rolling in on either side in a large body; 8 ditto weather; 10 The gale moderating and glass inclined to rise; midnight less wind with a high sea on, ship labouring severely, the sea striking her heavily and taking in much water on deck and below.

2d December.—Daylight found the driver-boom tossing astern. 8, wind still blowing strong with less sea; well 14 inches; throwing overboard 5 horses, that died from fatigue and want of air during the late bad weather; noon moderate and fine. Lat. Obs. 12° 58' South. Long. 82° 30'. East.

I now, as in the former Memoirs, arrange the logs of the ships in tables to shew at one view the weather and winds prevailing over this great space of the ocean which, it will be observed, reaches on the 1st and 2d November, over 24 degrees of Lat. including the equator, and during 5 days with severe storms blowing on both sides of it. This is alone a Meteorological curiosity of no small interest.

Comparative Table of Winds and Weather from Latitude 15º North, to 15º South, and from 24th November to 3d December, 1843.

the S. E. and S. S. E.

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	Remarks.	Fine clear weather.	Midnight heavy squalls, South.	Running to the Southward and under close reefs.	Standing to the Southward.	Standing to the E. by S. Tre- mendous high and confused sea	ing and rising.	4:30 A. M. shift S. S. E. to W. N. W. midnight 24th to 25th calm.	Calimi	Near the Coast of Ceylon bound	C.	Strong head sea, ship steering to		Noon high swell from the South- ward increasing fresh gale, mid-	night, W. S. W. steering to
	Ther.	0 8/		C/ana	73	8	470	ici ba	1		784	25		80	
	Simp. Ther.	u sin		is più	page in	:	e (fa	a htan	1	p •	:			:	NI II
	Barometer.	29.83	OUEST OF STREET	MARA N	29.78	29.64	train burn burn		•		29.82	29.70	i ha	29.78	
	Winds and Weather.	NORTHERN HEMISPHERE. Steady N. E. breeze.		W. by S	Fresh breeze and latterly squally W.	Dark gloomy variable S. L.	b - I m o a m a m	squally	77 11 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Noathern Hemisphere.	N. E. strong breeze.	More moderate to midnight wind about W. S. W.	S. W. to S. S. W. Noon S. S. W. fresh gale F. M.	S. W. by S. and S. W	. By account only.
	Long. E.	87 10	84 24			64 48		R .	Y.	•	86 23	1E 98	85 40	a lid	
	Lat. N.	, 15 27 Lat. S.	2 08	<b>7</b> 11 1	2 10	79 0	00.0	0 70		Lat. N.	12 43	2 -	5 41	TO MAN	
	Name of Place or Ship.	Winifred,	Flowers of Ugie,	John Fleming,	Elizabeth Ainslie,	Fulle Bozack,		Sophia,		Carena,	Winifred,	John Fleming,	Elizabeth Ainslie,		
The state of the s	Date.	Noon.								Noon. 25 Nov.					

Remarks.		Bar. at midnight, 29.68.	High cross sea midnight heavy puffs and lulls. Midnight moderate and squally.		The state of the s			· Thomas that A land that	Ship lying to under storm stay- sail, midnight blowing exces-	Noon hove to, midnight under
Simp. Ther.	0	20	8:		28			i i	:	8
Simp		y : 2	: :						:	1
Barometer.		. 29.80	29.63		08.80 13.80	29.80			29.50	29.63
Winds and Weather.	SOUTHERN HEMISPHERE. Variable S. W. to S. E. light breezes and cloudy Heavy squalls and rain,	strong gale S. by W. P. S. rong gale a W. to Soul	mostly S. W. violent squalls.	Northern Hemisphere, Variable, to East dark and threatening, P. M. strong	Variable from N. N. E., N. by E. and N. E. by N.	Steady winds N. and N. by E. Strong winds and cloudy,	Steady light breeze to noon from S. S. W. P. M. S. S. W.	Every appearance of a gale,	by W. blowing very hard.	and midnight moderating a little.
Long. E.	82 30 85 27	85 3	81 49	<b>3</b> 8 48	84 38	83 59	83 00	86 24	200	8
Lat. S.	6 15	24.5	5 50	9 40	8 19	7 50 5 43	6 42	5 58	26 2	3
Name of Place or Ship.	Edmondstone,	Futtle Rozack,	Sophia,	Winifred ;	Candahar,	Fyzul Curreem,	Edmonstone,	John Fleming	Plienhath Ainelia	
Date.	Noon. 25 Nov. 1845.			Noon. 26 Nov.				A STATE OF		



	1845.	] Elev	enth Me	moir on l	he Law	of Storm	s in Ind	ia. 3	9
	Kemarks.	Heavy sea, 4 P. M. hove to under	Strong to the S. E. b. S. Standing to the West and W. b.N.	P. M. edging away to S. E. b. E.	Sudden and dangerous gusts and	warning, P. M. heavy squalls.  Dark cloudy weather and a heavy	29.65 at midnight.	Near the Coast of Ceylon.	
	Simp. Ther.	• 5	: :	88	85	. 22	3	:	
	Simp.	.:	: :	:	:			:	
WALL SELVEN	Barometer.	29.62	::	29.63	29.67	29.72			
	Winds and Weather.	Southern Hemisphere. Increasing gale noon; 10 p. m. wind S.W. p. m. S. W. b.	Wind S. W. b. S. S.S. W. to South fresh breeze and cloudy,	South to S. W. hove to, heavy gale and furious squalls; P. M. wind S. W., W. S. W., and West	NORTHERN HEMISPHERE. E. N. E. 8 P. M. North; 4 A.M. N.N.W. thick gloomy weather and heavy rain,	N. E. & midnight N. E. b. E. Moderate but threatening from Eastward, P. M. increasing to a gale,	N. N. W. squally, P. M. heavy squalls N. N. W.	from N. iron Iron Iron Iron Iron Iron Iron Iron I	lent sea, midnight gale,
	Long. E.	86 21	82 53	86 23	85 56	83 50 88 40	83.36	: 83 36	
	Lat. S.	. 99	6 24	5 30	Lat. N. 7 4	55 58 58	S II s	 Lat. S. 6 58	
			::	:	**	* * *	:	1 1	
	Name of Place or Ship.	Flowers of Ugie,	Baboo, Sophia,	Futtle Rozack,	Winifred	Capdahar, Pazzelbarry,	Fyzul Curreem,	Carena, Edmonstone,	The second secon
	Date.	Noon 26 Nov. 1843.			Noon 27 Nov.				



4	10	Eleve	nth Mem	oir on t	he Lo	w c	of Storms	in India.	[No.	157.
	Remarks.	P. M. Bar. 29.40; A.M. sea increas-	To Noon ran 62 miles to the S. b. W.	Lying to. Basterly set of 60' from Noon 26th.	Course to the E. S. E.	Heavy S. E. swell.	Tremendous sea, A. M. wind shifted from W. S. W. to N. W. ship scudding to S. E. and South; Bar. at midnight 29.49.	Confused sea 11 P. M. most ter- rific squalls.	Heavy squalls and a strong mon- soon?	Midnight gale increasing, Bar. 29.45.
	Ther.	80	8	88	:	:	8	79	:	8
	Simp. Ther.	:	•	:	•	:	:		:	:
	Barometer.	29.50	29 60	29.57	:	: : :	29.43	29.65 8 P. M. 60 4 A. M. 57	29.70	29.54
-	Winds and Weather.	SOUTHERN HEMISPHERE. Heavy gale about S. W	from the W. N. W. wind N. W. b. N. N. W. 10 p. M. North, midnight N. N. E.	Heavy gale W. b. N. noon W. N. W. P. M. W. N. W. 10 P. M. N. W			gale, 10 P. M. North,	NORTHERN HEMISPHERE. N. W. to N. N. W. strong gales, heavy rain, and gloomy weather,	Strong Monsoon (?) N. E. b. E. 2 a. m. veering to the Northward.	6 A. M. N. E. Noon N. E. P.M. E. N. E. heavy gales,
	Long. E.	87 10		88 4	•	: 00	8	85 58	83 45	88 10
	Lat. S.	6.26		6 20	: 0	8 8	8.	Lat N.	9 15	7 22
The state of the s	Name of Place or Ship.	John Fleming,	Elizabeth Alimite,	Flgwers of Ugie,	•	Sophia,	Futtle Rozack,	Winifred,	Candahar	Fazzelbarry,
1 Downson Colored	Date.	Noon 27 Nov.	Ź					Noon. 28 Nov.		



1845.]	Eleventh Me	moir on the L	aw of Storn	ns in India.	41
Remarks.	Off the Coast of Ceylon.		29.30 no e reefed e up at 1 to, mid	from the South.	Heavy gale N. E. throughout, the wind having veered to N. E. from North in a furious squall.
Ther.	• :	. 08	8		
Simp.					
Barometer.		29.50	. 29.5		
Winds and Weather.	NORTHERN HEMISPHERI Fresh breezes and squal N.E. b.E. to N. N. W. N. N. W. to N. W. fre breeze, P. M. fresh ga West,	Noon, more moderate drawing to N. W. P. M. Continuing N. N. W. 8 P. M.	Wind E. N. E. hard gale with tremendous sea, P. M. E. N. E., 6 P. M. East.	S. by E. to S. S. W. with thick weather, P. M. S. W. to S. W. b W. increasing,	Wind N. E. throughout, heavy gale and tremen- dous squalls and sea,
Long. B.	83 404	z 78	87 02	81 34	87 17
Lat. N.	2 06 50	7.7	8 21	6.23	7 39
Name of Place or Ship.	Carena, Fyzul Curreem,	John Fleming,	Elizabeth Ainslie,	Sophia,	Futtle Rozack,
Date.	Noon 28 Nov. 1843.			G	



42	Eleventh Memo	oir on the l	Law	of Storn	ns in Ind	lia. [N	o. 157.
Remarks.	From 10 P. M. on 27 to 6 A. M. on 28th ran 40' to S. W. b S. but sea increasing hove to	Ship runfing to S. E., S. S. E., S. b. E., and S. b W.		Succession of dangerous squalls and thick weather, Bar. rising	and tailing. 6 P. M. hove to.	Ship running to the Southward,	and in great distress. 4 P. M. Bar. 29.34
Ther.	° &			18			:
Simp.	:			•	:		
Barometer.	29.63			29.59	29.70	29.41	29.33
Winds and Weather.	SOUTHERN HEMISPHERE.  2 A. M. N. N. W. and to midnight North, strong gales.	So 10 A. M. S. to S. S. W. heavy squalls, noon S. W. b W. 6 P. M. W. S. W., to midnight strong gales.	NORTHERN HEMISPHERE.	N. N. W. Veering to West, violent squalls, dark dis- mal gloomy weather.	Heavy breeze N. b E. P. M. increasing rapidly, every appearance of a storm, P. M. North,	Blowing furiously N. E. b. E. Noon N. E., P. M. furious gale N. N. E. 11:	S. W. Fresh gale, and squal- ly, P. M. S. S. W. and S., 10 P. M. S. S. E.
Long.E.	88 49	85 10		86 30	83 48	87 20	•
Lat. S. Long.E.	7.41	7.8	Lat. N.	1 20	9.56	• •	5 33
Name of Place or Ship.	Flowers of Ugie,	Baboo,		Winifred,	Candabar,	Fazzulbarry,	Bittern
Date.	Noon 28 Nov. 1843.			Noon 29 Nov.			



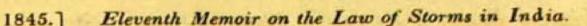
1845.] Eleventh Memoir on the Law of S	Storms in India.
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1010.						aw i	y su	irms	in Ina	
Remarks.	1 0	ning at night. Off Ceylon.	9 а. м. hove to. 10 в. м. bore	up again. Ship buried in the sea, head to	N. N. W.	A. M. boats blowing from the	Very dirty annearance all sound	Increasing steadily to midnight, gale continuing, position by	estimate.  A. M. tried to scud. Noon hove	to again.  10 a. m. bore up and ran to S. W. b S. 4 v. m. Bar. 29.66.
Ther.	· :		:	79		. 11			18	8
Simp. Ther.	:		:	28.9		:		:	:	:
Barometer,	:		:	29.0		29.0			29.59	29.67
Winds and Weather,	Northern Hemisphere. N. W. N. N. E. and W. N W. with dark squally and threatening weather.	Southern Hemisphere.	2 A. M. W. S. W. 9 West P. M. W. by S. and W. N. W.	Hurricane about N. B. P.M. between N. and E.	SP. M. a lull, 7 A. M. North, burricane, noon hard puffs	North, 9 N. N. W.	Heavygale commenced, S.S. W. to S. W. b W. to West	Gale from West throughout.	N. E. till noon blowing most furiously, P. M. N. E. to East.	8 moderating Noon strong gales P. M. N. E. 10 P. M. N. E
Long. E.	· :	•	83 67	86 20	85 07		82 0	St 31	81 18	87 40
Lat. N.	· :	Lat. S.	803		8 40		6.48	0 54†	9 47	8 46
Name of Place or Ship.	Carena,		Edmonstone,*	John Fleming,	Elizabeth Ainslie,		Sophia,	Fyzul Curreem,	Futtle Rozack,	Flowers of Ugie 8 46
Date.	Noon 29 Nov. Carena, 1843.					- 10				

\* Latitude and Longitude, estimated only.



44	Eleventh M	emoir on the	Law of Stor	ms in India.	[No. 157.
Remarks.	Vessel running to the S. W. S. S. W. and S. b. W. position from estimate only.	Steering to the Eastward from Madras roads from 7 P. M.	Surf very high and strong current to the Northward.  Il A. M. Terrific squall.	Vessel first steering to the S. S. E. and then to N. E. with the S. W. breeze.  Bar. 30.3, noon 30.11, 2 P. M.	5 P. M. Bar. 29.30 and 8. 29.41. P. M. wind moderating and ship making some sail.
Ther.	• :	:	: :	: 83	: :
Simp.	:		: :		
Barometer.		30.12	29.50	29.40	29.34
Winds and Weather.	Strong gales W. S. W. and Westerly P. M. N. W.	Fresh monsoon, N. N. E.	N. W. b. N. and N. W. beavy gale,  3 A. M. North gale at its highest fury, noon mode-	ken. breeze N. N. E. mal we	E. N. E. Fresh gale throughout.  I A. M. N. W. strong gales, at 7 Westerly, P. M. S. S. W.
Lat. S. Long. E.	· :	: :	8357		: :
Lat S.	· ;	. : : :	9 40	12.20	8 :
Name of Place or Ship.	Baboo,	Vernon, off Madras, AT MADRAS	Candahar, Fyzulbarry,	Mary Imrie,	Bittern,
Date.	Noon 29 Nov. 1843.	Noon 30 Nov			



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Ship.	Lat. S.	Long. E.	Winds and Weather.	Barometer.	Simp. Ther.	Ther.	Remarks.
	ò		SOUTHERN HEMISPHERE.			0	
Winifred,*	-	98 0	West, dismal weather and violent squalls, varying to N. W.	29.64	:	83	Barometer vibrating greatly in the severe squalis.
Sophia, Edmonstone,	: 6	: 8	Hard gale N. W. S. N. N. W. D. O. N. N. W. D. N. W.				Midnioht Bar, rising a little.
John Fleming		:	Hurricane between North &		: :		Cut away top-masts. Boats blow-
Flowers of Ugie,	10 52	. 86 24	Strong gale N. E. b. E., noon N. E. midnight E. N. E.	29.59	:	88	Ran to the S. W. b. S. 158' and hove to again. Bar. 2 P. M. 29.58. Midnight 29.49.
Elizabeth Ainslie,	•		Wind North to noon, P.M. hurricane N. to. N. N.E.	. 28.80	: •	87	Ship on her beam ends, sails blow- ing from the yards, furious hurricane.
::	10 23	84 30	Hurricane about East. Commencing gale from S.+ W. on this day.	٠			
Futtle Rozack,	3 50	88 0 22		29,61	: :	: 8	Moderating from S A. M. A. M. gale abating a little, F. M. more moderate, heavy sea.
Baboo, Wellington,	13 37	88	N.W.stronggale to'midnight	29.68	::	:83	Running 7 knots to the S. W.



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Ų	46	Eleventh	Memoir	on the	Law o	f Storms i	n India.	[No	. 157.
The state of the s	Remarks.		Strong surf and Northerly cur-	From noon increasing in violence till 6 %. M. of 2d.		Bar. at 3 P. M. fell to 29.40, noon to 3 P M. very little wind, midnight apparently steady at S.	Midnight moderating.		Midnight very threatening, Bar. 29.25 wind hauling apparently to the Westward.
	Ther.	•	:	:			68		: 3
	Simp.	29.52	:.	:			:		:
	Barometer.	29.68	29.981 - 877 - 953			:	7. 29.30 9.29.45 11. 29.55 Noon 29.65	3.29.75	29,60
	Winds and Weather.	NORTHERN HEMISPHERE. N. N. E. to noon, r. M. N. E. and midnight E. N. E.	N. W. throughout, A. M. Noon, 10 F. M.	N. W. commencing about noon,	to West and W. S. W. and increasing. N. W. and freshening from	A. M. heavy gale N. W. at S P. M. shifted to S. W., 5 N. W., 10 S. W.	Hard gale, S. W. to E. S. E. 4 A. M. increasing S. S. W. gale, noon South, P. M. S. S. W.	Heavy cale about N. N. E.	clearing little at noon,
	Long.E.	83 29	:	•	: :	8 3	88 00	18	
	Lat. N.	12.5		:	: :	10 32	10 00 9 55	10.4	
CALLES OF THE PARTY OF THE PART	Name of Place or Ship.	Vernon,	At Madras,	of Ceylon,	At Paumbom,	Candahar,	Niagara, Fyzulbarry,	Mary Imrie	
The second	Date.	Noon lst Dec. 1843.							

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Remarks.	Dismasted.  Bar. 29.24 at noon to 29.49 at midnight?	Latterly scudding under reefed fore-sail.		-d P M. hove to.	Moderating to midnight.	4 P. M. Bar. rising.	Midnight heavy sea from the S.	Bar. from 29.50 to 29.60. Simp. 29.2 to 29.10.	the state of the s
Ther.	•:	:	83	:	:	35	:	:	
Simp. Ther.	: •			:	28.4+	:	:	:	
Barometer.	29.24		\$ Noon - 67 8 P. M 68	:	:	29.50		:	
Winds and Weather.	NORTHERN HEMISPHERE. East fresh gale, midnight about S. b. E.	Wind Southerly strong gale, 2 p. m. wind S. S. E., 11 p. m. S. E.	Southern Hemisphere. N. W. dark gloomy weather and violent squalls, P. M. moderating.	Strong gales N. E. to mid-	Hurricane between N. and	b. E. Strong gales and tur- bulent sea tolmidnight.	P. M. Moderating, wind N. W. throughout.	To noon N. W., P. M. heavy gale N. N. W. Blowing heavy at East with tremendous squalls.	100 100 HOLD TO BE TO B
Lat N. Long.E.	85 20 * ::	: *	86 56	84 22		80 18	3	::	
Lat N.	6 50 9 49	196	Lat. S. 3 15	11.15	: :	211	200	11.0	
Name of Place or Ship.	Col. Burney,	Carena,	Winifred,	Edmonstone,		of Ugie,	sopnia,	Baboo, True Briton,	
ite.	Oon Dec.								

\* According to the copy of Captain Durham's letter to his owner, it was in Lat. 6° 00 N. Long. E6° E. I presume the newspaper to be right as Captain Durham might have thought it unnecessary to state more than in degrees his true position to his owners whereas to the Master Attendant of Point de Galle he might probably have given it to minutes.

4	8	Elevent	h Memoi	r on th	e Lar	v of Sto	rms	in In	dia.	[N	o. 157	
	Remarks.	Strong sea from W. S. W. and current of 29' to the E. N. E.		High sea or dark cloudy wea-		2 A. M. wind shifted to E. S. E. confused sea and much lightning. F. M. moderating.		Strong North current and high	Strong North current and high surf.		Heavy bank to N. E. but no	wind from that quarter.
	Ther.	•	: 62	:	81	18		:			:	
	Simp. Ther.		: :	:	:	29.54	NA.	:			:	
	Barometer.		29.58	\$ 29.30 to-45	29.62	29.69	29.84	98				
	Winds and Weather.	SOUTHERN HEMISPHERE. 10 A. M. N. W. Noon fine P. M. N. N. W. and	East, gale increasing.  Moderating to noon beavy	wind N. N. E. and P. M.	Gale abating, N. E. through-	NORTHERN HEMISPHERE. 9 A. M. E. b. S. P. M. East- erly 7 P. M. E. S. E. and fine	AN AN ARCHITECTURE OF THE PARTY	6 A. M. N. W., P. M. North.	N. W. from 6 P. M. to mid- night blowing with great	6 A. M. heavy gale W. b. S. to midnight.	veering to Westward, mid- night heavy gale W.S.W.	
	Long. E.	85 374	83 47		85 47	83 38	The state of	:	•	:	:	
	Lat. S.	5 39	13 25	7 B	11 10	Lat. N. 11 48		:	:		:	
	Name of Place or Ship.	Fyzul Curreem,	Wellington,		Futtle Rozack,	Vernon,		At Madras,	At Kayto,	At DELPT ISLAND,	At Paumbum,	
	Date.	Noon st Dec. 1843.				Noon						



1845.] Eleventh Memoir on the Law of Storms in India. 49							
Remarks.	Vessel steering to the North and N. W. raund the Eastern and N. Eastern quadrants of the storm.  F. M. Bar. 29.80.  Midnight fine.  Midnight fresh gale.  Heavy cross sea.  High swell from the North.  At midnight fine.  On 3d quite fine.  Ship steering to the W. b. S. On 3d fine, Lat. 11° 7' S. 80° 49' E.  Heavy head sea.						
Ther.	。 : 8 : : 8 : 8 : : : :						
Simp.	: :::::::::::::::::::::::::::::::::::::						
Barometer.	29.40 29.80 29.25 29.25 29.25 29.83 29.83						
Winds and Weather.	Fine wind S.S.E. to E.S.E.  T. M. violent gale S. W.  4. A. M. South P. M. S. S.  E. and S. E.  S. E. and S. E.  S. E. moderating, P. M. E.  S. E. and S. E.  Southerr Hemisphere.  Southerr Hemisphere.  Southerr Hemisphere.  Galms and fine,  Wind North and N. E. moderate and fine,  Wind North and M. E.  N. E. b. E. clearing up,  P. M. E. N. E.  Wind East to noon moderate.  Wind East to noon moderate.  F. M. wind marked Easterly heavy gale to midnight.  North fresh breeze & cloudy.  Moderate and fine,  F. M. wind marked Easterly heavy gale to midnight.  North fresh breeze & cloudy.  Moderate and fine,  F. M. Wind East to noon moderate.  North fresh breeze & cloudy.						
Long. E.							
Lat. N.	Lat. S. 12 12 12 13 20 12 23 13 20 12 28 13 20 1						
Name of Place or Ship.	Fyzulbarry,  Bittern,  Bittern,  Carena,  Carena,  Edmonstone,  Edmonstone,  Flowers of Ugie,  Futtle Rozack,  Sophia,  True Briton,  True Briton,  Fyzul Curreem,  Wellington,						
Date.	Noon M Dec. 1843.						



### PART I.

#### SUMMARY.

## Southern Hemisphere.

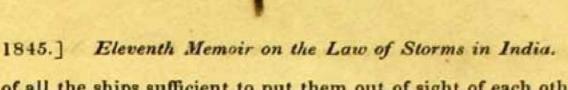
I have divided this summary into two parts to separate the storms of the Northern and that of the Southern Hemispheres from each other. If we review the tables, and this will be usually found the best means of forming an approximate judgment, at a glance we shall find, that,

On the 24th of November.—There is fine weather in the Northern Hemisphere with the Winifred in 15½° N. and we have no other Logs for that day in Northern Lat. nearer to the equator. In the Southern Hemisphere in Lat 4° 47′, S. a gale had so far begun with the John Fleming as to reduce her to close reefs, but her Bar. had not fallen below 29.72: yet the thick weather, rain and heavy sea might be thought sufficient indication, that she was on the verge, at least, of the commencing storm, the centre of which must then have borne about S. S. E. to S. b. E. of her; as in the Southern Hemisphere we assume,—and this memoir will amply prove it,—that the revolution of the rotatory storms is from the South (on the left hand) to the West, North and East.

But we shall observe at the same time, that at Noon on the same day the Flowers of Ugie was, by her Log worked back from Noon of the 25th\* within 12 or 15 miles of the John Fleming and yet she had but light airs, calms, and breezes from the South and S. S. W. from noon till midnight, when the weather began to be squally, increasing to a strong gale at Noon of 25th, though even then her Bar. was at 29.80.

We have then the Elizabeth Ainslie in 5° 10' S. and Long. 84° 25' E. or within 3 miles of the Ugie (though their logs do not mention being in sight of each other) and there are thus possibly errors in the positions

<sup>\*</sup> The extract sent me begins on the 25th. Nautical time and though the Log is perfectly well and even carefully kept, it has the fault of adopting the Coaster form of marking the run per Log every two hours only; which thus always renders it in some degree obscure for purposes of after reference and exact calculation.



of all the ships sufficient to put them out of sight of each other. \* This ship had also, up to noon, a fresh breeze and squally weather, and her Bar. at 29.78. the wind at West and W. b. S. and becoming more squally as she ran to the S. Eastward between noon and midnight. The Futtle Rozack was the next ship to the Southward, being in 5° 32' S. and 84° 49' E. on this day. As will be seen by her log, which is well worth an attentive perusal, she had indications of suspicious weather from the 21st in 1° 22' S. and these were increasing every day; her weather on this day (the 24th) being dark and gloomy, with variable squalls and even calms at times, but with a tremendous high sea from the South, " the wind" lulling and coming on again with a moaning noise," her Bar. was yet at 29.64. † We have thus four ships, the John Fleming, Flowers of Ugie, Elizabeth Anslie, and Futtle Rozack, in a space comprised within 45 miles of Lat. and 25 of Long. so that allowing for slight errors of instruments and observations the whole were within less than a square degree of each other, and as we have seen they seem to have had just such variable streams of wind and intervals of calms or light breezes, with even fine weather, as we might suppose a priori to exist on the outer verge of a storm, and which those who have followed the investigations of them, both here and through Col. Reid and Mr. Redfield's works have found in both Hemispheres. It is curious that none of the other ships remark on this day, though they do so on the 25th, upon the heavy sea, so carefully noticed in Captain Rundle's remarks; I shall advert to this again. We may thus consider the gale of the John Fleming as perhaps a commencing stream of wind on the circumference of a vortex, for I must again reiterate here that while of course a storm must begin somewhere and somehow, we are profoundly ignorant, both of the how and the where it begins, whether at the centre or on the circumference, and what its effects at the circumference are both when beginning and after it is in progress, and can only therefore carefully register every fact which may tend to throw the faintest light upon the manner in which these tremendous phænomena

<sup>\*</sup> This bowever may not be the case; a Commander of one of the ships told me that there were "several of us close together when the gale commenced" and he meant in sight, for he remarked upon the want of preparation apparent in one or two vessels.

<sup>†</sup> Nearly correct, for its slight error of .07 was ascertained here.

first develope themselves, or are felt, at the extreme verge of their peripheries or at their centres.

We cannot therefore assign any centre for the storm on the 24th, for we have no evidence beyond the heavy swell just alluded to that it was fairly begun any where on that day; though it should be borne in mind that it may have been also coming up from a distance, and that the incipient gale of the John Fleming was perhaps an extra-vortical stream thrown off from the main body of the storm, and the heights of the Bars. of the John Fleming and Ugie as late as noon of the 25th lends some countenance to the probability that the storm had formed and was really coming up. It is remarkable also that on this day the Fleming had the weather "more moderate" than on the 24th, while with the flowers of Ugie it was "a strong gale" at noon.

On the 25th November .- At noon it will be seen that these four ships the Fleming, Ugie, Ainslie, and Futtle Rozack, were all within a square space of 45 miles on each side, or as before, allowing for slight errors, all within a square degree, having made from 16 to 85 miles to the S. E. by Eastward. The Fleming was the northernmost ship, and in about 6° S., the other three nearly on the same parallel of 5.40. S. and from 85° to 85° 40' East. The Fleming as above remarked has the weather moderating considerably on this day, and this is a proof that her gale of the 24th, was as we supposed, in all probability, an extravortical stream thrown off from the gale into which the other three ships 40 miles to the South of her, were now fairly entered. † They had all four on this day the high Southerly sea, which may be said for the Ugie, Fleming, and Ainslie, to have begun from midnight, 24th 25th, when the Ugie marks 2 points of lee-way and she begins her preparations for bad weather also from this time. Excluding the Fleming since she was not yet fairly in the storm and taking the three other ships just mentioned to have been within it, we find they had all the

<sup>\*</sup> The vignette titles to the Charts are purposely drawn to shew these kinds of irregularities either at the circumference or in the bodies of the storms. If considered attentively the reader will see that the arrows may curve more inwards or outwards, or be in the exact circumference of every circle, from a hundred varying causes and forces.

<sup>†</sup> Here we have an explanation of this treacherous moderating of the weather which I have often remarked upon, see "Horn Book of Storms," p. 11, and which every seaman of experience in tropical seas knows.

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wind at from between South to S. S. W. and S. W. those which had it steadiest and were furthest to the Eastward, i. e. nearest to the centre, which are the Ainslie and Ugie, having it between South and S. S. W. so that we may call it almost S. b. W. on the average, which would give the centre bearing at noon E. b S., from the centre of the triangle formed by them, at any distance we may suppose; but it is barely possible to assign this, as we know nothing of the general sizes of the vortices in the Southern hemisphere or of this one in particular. We may notice also that to this day the two ships Edmonstone and Sophia which were, though in about the same Lat. three or four degrees to the West of the others, had nothing but variable light breezes, and fine weather.

On the 26th November .- We have still the same four ships near each other, though somewhat more dispersed ... two, the Futtle Rozack and Ainslie, being at 73 miles from each other and the other two about midway between them, the whole four had severe gales and by noon, the Fleming was lying to under storm stay sails; the Ugie under bare poles at 4 P. M. and the Ainslie also hove to at noon. These three ships had the wind between W. S. W. and S. W. The Futtle Rozack, the northernmost ship, having it about S. W. at noon, though as she was running away to the S. E. b. E. she found it drawing more Westerly. Taking a spot in the middle of the acute rhomboid formed by their four positions,\* which will only differ 35 miles at farthest from the two most distant from each other, and this in the line of the perpendicular, we shall find it to be in Lat. 6° 5' S. Long. 86° 30' E. and if we take it that here the average wind was really S. W. b. W. 1 W. we shall have the centre bearing from us S. E. b S. 1 S. and we may perhaps assume that the distance of it did not exceed from this spot 150 miles, which would place it as I have marked it in Lat. 8° 17' S., Long. 87° 45' E. It was not much more than this distance, for the Sophia and Edmonstone which were about 220 miles due West of these four ships, had still fine weather with a brisk S. S. W. and Southerly breeze at noon in this day and the Baboo, as nearly as we

<sup>\*</sup> This, when the positions of vessels do not afford cross bearings by the perpendiculars from their tangents is far the safest and must be the most correct method, particularly if we take into account how ill the exact positions can be ascertained in such weather and with how little exactitude the direction of the wind also is noted in most logs.

can judge from her Lat. and Long. was in Long. 83° 40′ E. Lat. 6° 17′ South or about 180 miles also to the Westward, standing close hauled  $4\frac{1}{2}$  knots to the S. E. b S. with the wind at S. W. b S. but with only squally and rainy weather, whereas had the storm been of much larger dimensions, that is if its centre was at any much greater distance from the mean point between the four ships already noted above, the Baboo must now have felt it more severely. Hence 150 miles is certainly the utmost semi-diameter we can allow to the storm on this day, supposing the circle to be fully formed.

27th November.—The positions, of the same four ships, again form a triangular figure, of which the longest diameter from W.S.W. to E.N.E. is 75 miles and the perpendicular about 20. Three of them indeed, the Fleming, Ainslie, and Futtle Rozack are so placed that their mean distance is but about 18 miles, and I take this spot, Lat. 6°32' S. Long. 87°13' E. to be the average position of those three ships. Their winds as marked in the logs are;

Elizabeth Ainslie about N. W. b W. Fleming about W. N. W. Futtle Rozack N. W.

N. W. b. W. is thus about the mean of their winds and the Ugie we find had it W. N. W. Projecting these for the supposed bearing of the centre S. W. b S. and S. S. W. it will give us two diverging lines, not an unfrequent case where ships are near each other, the weather severe, and the wind not probably "filled up," (if marked at all in the log) till a day or two afterwards. To the Westward we have the Edmonstone and Baboo with apparently streams of winds from the South and S. S. W. and a sea from S. E. such as might be expected on the Western verge of a gale, and exactly analogous to those experienced by the Ainslie, Ugie, and other ships on the 25th when on its Northern verge; and those ships Edmonstone, and Baboo, were also standing on the starboard tack to the E. S. E, so as to run towards it. The Sophia, a degree farther to the Westward, has the S. E. swell but less wind.

\* This is no exaggeration, as every one who knows what the severe and anxious duties of the master and officers of a merchant ship, under the present economical systems of sailing them, become in bad weather will fully admit; and we must add here that most of our ships had Lascar crews and Coolies on board. I do not then it will be understood, make the remark in the text disparagingly, but as necessary to put the reader in full possession of the facts and the grounds of my judgment.



We must therefore, as the gale had not yet reached the Baboo, which ship is the nearest, and at about 150 miles from the Futtle Rozack, Ainslie, and Fleming, conclude that it did not much exceed 100 miles in its semi-diameter, and taking this distance on each bearing line and then the mean point between the two, we obtain a spot in Lat. 7° 50′ S. Long. 86° 52′ E. for the approximate place of the centre of our storm for the 27th, but we shall find on the 28th that this very nearly approaches what must have been its true place as shewn by the veering of the winds, as the ships running and drifting to the S. S. E. sailed close round the centre, which was slowly moving to the N. W.

On the 28th of November.—We find on this day three of our ships the Fleming, Futtle Rozack, and Ainslie, nearly on the same meridian, but with a difference of 75 miles in Lat. between the Fleming, the northernmost and the Ainslie the southernmost ship, all having run or drifted, as the wind veered with them, to between the S. S. East and S. b. Westward, and the hurricane having been stationary or passed very slowly to the N. Westward, judging from its approximate track already laid down. Now if the circular theory be true, and if there was this progressive motion we ought to find that these ships have brought the winds from N. N. W. to North and N. East, according to their positions on various parts of the circle, having run or drifted, as before said, round the N. Eastern and Eastern, and one of them, the Ainslie, reached the S. Eastern quadrant of the storm circle. We have accordingly at noon.

The Fleming with the wind

More moderate and drawing to the N. W.\* P. M. N. W. and as the ship was running to the S. W. at 8 P. M. N. East.

The Futtle Rozack.

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Wind N. E. throughout, having veered from North with tremendous sea, her course nearly parallel to the track of the storm.

The Ainslie. .. .. N. E. hard gale, tremendous sea. P. M. E. N. E. 6 P. M. East.

While the *Ugie* from 80 to 90 miles to the Eastward of these ships has the gale first from N. N. W. but by running to the S. W. b S. brings it to North: all this is, as will readily be comprehended in exact con-

<sup>\*</sup> I suppose it to be about N. W. b. N.

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formity with our law of storms for the Southern Hemisphere; and to the Westward we have now moreover.

The Edmonstone. ... { With strong gale and mountainous sea wind about S. S. W. veering to S.W. after noon.

which are also about the winds which ships entering the storm on its western quadrant should have. The Sophia is yet too far to the Westward to feel much of the storm. Taking all these data we find that the nearest spot which will reconcile them, within either a few miles of their position as given or calculated, or within a point or more of the direction of the wind,\* is one in Lat. 7° 18′ S. and 86° 45′ E. where I have therefore placed the approximate centre of the storm for this day.

On the 29th November.—The positions of the ships are now becoming, it should be recollected, very uncertain from the continuance of the bad weather, and thus any estimation of the true place of the centre of the storm from their supposed places at noon, becomes more and more difficult. Nevertheless if we take a point near the calculated place

- \* I use here these words, intentionally, and as writing for unprofessional as well as professional men, and anxious that not only all our data, but also all the considerations which would influence the mind of a scientific seaman in considering what weight he would give to these data, should be known to all. It occurs to me that I may usefully set down here, what considerations must be taken into account in considering log book relations of storms. The seaman is acquainted with most of them, but some may be new even to him. The data are first the ship's place, second the direction of the wind, third the run or drift, fourth the sea, these are influenced by,
  - 1 Want of observations.
  - 2 Bad observations set down as good ones.
- 3 Run or drift ill kept or badly estimated, few ships marking their lee-way for instance, and some being much more lee-wardly than others.
  - 4 Storm wave, \ See 8th Memoir, Joer. As. Soc. Vol. XII. p. 397 for the ex-
  - 5 Storm current, | planation of these terms.
  - 6 Wind carefully or carelessly noted?
  - 7 Not noted at all till a day or two after the storm?
  - 8 Veering of the wind set down at the wrong hours.
  - 9 Alterations of courses also set down wrong, or at wrong time.
- 10 Inaccuracy of all data from errors of copyists or printers; the last almost continual in Newspaper accounts.



of the Elizabeth Ainslie which ship must have been close to the centre at noon, for she was in it at 5 p. m. on this day, we shall find, that it agrees so far as to make the following ships have the winds by the chart and by their logs as follows:—

Wind by Log. Wind by the projection. about North. .. Assumed correct. Elizabeth Ainslie, between N. and E. N. & E. John Fleming, N. & E. about N. b E. Flowers of Ugie, N. N. E. J E. N. East. Futtle Rozack, W. by N. Westerly. .. Baboo. West. West. .. .. Edmonstone, about W. S. W. S. W. by S. Sophia, .. ..

which is near enough for these seven ships to allow us to assume it. It will then be for this day in Lat. 8° 38' S. Long. 85° 00 E.

On the 30th November.—We find that a number of the ships which had drifted or run to the South and South Westward, were evidently on the Eastern and South Eastern and Southern quadrants of the storm, having the winds from N. by E. to N. E. and East, while others were on the Northern, and the Sophia on the extreme North Western verge. The Edmonstone which ship had run down about a degree and a half to the Southward; (S. S. E. South and S. S. W.) had the wind also veering as it should veer with a Hurricane slowly progressing to the Westward, while she was running partly round the N. Eastern, and towards the Eastern quadrants of it; and her Bar. also was falling from midnight of the 29th to 30th, as by bearing up, she run down again towards, and neared the centre. We find it again rising also when, having brought the centre of the Hurricane to bear W. b N. of her (wind N. b E.) towards midnight of the 1st December, she again heaves to and allowed the storm to pass slowly away from her, while she drifted away from it. The following will be found the directions of the wind as given in the ship's logs and those which the centre of the Hurricane, as assumed\* for this day, and the positions of the ships give at Noon.

<sup>\*</sup> I use this word "assumed" rather in contradistinction to "shown" or "demonstrated" because of the great uncertainty of many of the ships' positions, of which some have now been three or four days without observations and keeping a very indifferent note of the drift, sea, and even of courses, and winds.

of ban my U to me worth	ind by the Log.	Winds by their posi- tions on the chart.				
Edmonstone,	N. N. W					
Flowers of Ugie,	N. E	N. E.				
Futtle Rozack,	N. E	N. E.				
Active,*	about East	E. N. E.				
Baboo,	• N. W	N. b. W.				
Wellington,	E. S. E	E. 3 S.				

The Ainslie and John Fleming's positions are both utterly uncertain on this day, though both ships were doubtless from the violence and veerings of the wind with them, close to the centre; no sort of account indeed could well be kept in these ships as from stress of weather, they were obliged to steer various courses so as to ease the vessel as much as possible, on account of their cooley passengers. The Ward from the inperfect newspaper account appears, though a degree or more to the North of the Wellington, to have had it at S. W. commencing on this day, though her position is quite uncertain, + as the Lat. and Long. given, as in the case of the Active, seem to have been intended to express the spot where they had the heaviest weather and not the ship's place.

The log of the Sophia offers a considerable anomaly. By the position of our centre from which she is at 180 miles distance, which is much less than the distance of the Wellington, and about the distance of the Futtle Rozack and Ugie from it, she should have the wind at S. W. while she has it at North W. by her log! I am unable at present to reconcile this. It may be an error in copying, or it may be that she met with another and a new storm thrown off in advance of the principal one, or finally she may have been carried much further to the Eastward than she supposed, and thus have been really on the N. Eastern quadrant as her wind would place her. I leave it therefore for the present.

<sup>\*</sup> This vessel's place is also uncertain, for the Lat. and Long. given in the newspaper appear to be that of the ship when the storm was at its height, rather than that of a given date.

t The position is wholly wrong. The Ward spoke the Sophia on the 26th in 64 S. and therefore could not be on the 30th in 12. 30, So, both having Southerly winds. She was probably on this day somewhere between the Sophia's and Baboo's tracks which would give her the S. Westerly gale mentioned.



On the 1st December .- We have the Flowers of Ugie and Futtle Rozack close together with a heavy gale at N. E., and the Edmonstone also, which ship had run to the Southward about 150 miles, making but little westing, was now nearly on the same parallel, but 90 miles to the Westward of the two former ships, also with a N. Easterly gale. This places all three ships on the S. E. quadrant of the storm circle; and we have the Fleming with a hurricane between North and East " and the Ainslie with puffs and lulls from the N. E.," indicating that both were not far from the centre and also on the same quadrant. The Fleming appears to have run in company with the storm for some time, and as the Ainslie was hove to, we see by her rising Bar. that it was, by her drift, rapidly passing from her. The track laid down for these two vessels it will be remembered is merely, a line to join the two points between the 29th November, and 2nd and 3rd December, their position being wholly uncertain between those dates. The Baboo and Sophia both mark winds at N. W. but the positions of both are very uncertain. Hence we may I think place the centre of the storm for this day about in Lat. 9° 35' S. and Long. 83° 42' E. and it will give the winds to the ships as follows :-

Ugie and Futtle Rozack about, .. N. E. by E.

Ainslie and Fleming's positions N. Eastward.

wholly uncertain, .. .. E. N. E.

Wellington, .. .. .. .. East.

which with the exception of the Edmonstone is not far from what they had. For the position of the Baboo, we have only her Lat. which however would undoubtedly place her on the N. E. quadrant and therefore give her a North Westerly wind. The Sophia (or her position) is an anomaly which I must leave as I find it. She has by the position given, and with our centre, the wind a little to Southward of West, but by her log as marked she had a heavy North Westerly gale, she may have again been farther to the Eastward than she supposed for she could have had no good observations for the preceding 3 days, and this as before remarked would place her on the right quadrant of the circle for a N. Westerly gale, I have however, marked a storm arrow through her supposed position for this day.

On the 2nd December .- We have the Futtle Rozack, Edmonstone,

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Ainslie, and Fleming, all not far from the same parallel of Lat. but dispersed over four degrees of Long. The Fleming (position uncertain) being the Westernmost, and Futtle Rozack farthest to the E. We have the Ugie also about a degree to the Southward of them, and the weather is fair, or clearing up fast with a fair Easterly breeze, for all these ships by noon on this day, as being on the S.E. quadrant of the storm, had run or drifted out of it; and had no doubt now a part of the usual trade wind. The Sophia is found on this day in about the Lat. of the centre of the 1st, and she has the wind at North, at noon, from a heavy gale at N. W. on the preceding days, shewing evidently that her storm could not have been the same as the one we have been considering, i. e. that of the Futtle Rozack, Ugie and and other ships. She notes also, that at midnight between the 1st and 2nd there was a heavy sea coming up from S. W. which was in all probability the sea from the Ugie's storm, to judge by the positions of our circles.

### PART II.

# Storms in the Northern Hemisphere.

25th November.—In the Northern Hemisphere we have nothing extraordinary for this day, the Carena off Ceylon having light airs and the Winifred in the middle of the bay in Lat. 13° a fresh monsoon with an average Bar.

26th November.—The Winifred, Candahar, and Fyzul Curreem, have winds and weather indicating a change, though there is nothing sufficiently pronounced to be called, as yet, the commencement of a storm, and the Bars. of both the Candahar and Winifred are high.

and Fyzul Curreem, each with signs of the approaching storm, which was afterwards so severe with the Fyzulbarry, (and perhaps the Colonel Burney?) The Winifred in Lat. 7° 4′ N. and Long. 85° 56′ E. at noon is running rapidly to the South, the wind veering from E. N. E. at noon to North at 8 p. m., and N. N. W. at 4 a. m. with thick gloomy weather and violent squalls, "giving little warning" says Captain Webb; an apt phrase to designate squalls thrown off from the periphery of a rotatory storm, if they were such.



The Fyzul Curreem in Lat. 5° 11' S., but in Long. 83° 36' E., or two degrees farther to the Westward has squally weather from N. N. W. and the Fyzulbarry in Lat. 5° 38' and in 88.° 40' East, has it threatening from the Eastward with a heavy N. E. sea, her Bar. falling, and P. M. the wind increasing to a gale from E. N. E. with a heavy sea. We may thus assume that with this ship, at midnight, a storm had fairly begun from N. E., at which we find it marked at 1 A. M. on the morning of the 28th; at what distance we have no means of judging. I have therefore for this day marked but a single segment of a circle through the Fyzulbarry's position, from a centre 240 miles due S. E. of it, which is to be taken rather as an indication of the storm than any thing else.

On the 28th November.—We have the Winifred in 4° 27' N. and Fyzul Curreem in 2° 06' N. the first with "strong gales N. W. and N. N. W. and gloomy weather with her Bar. falling a little, and the latter with only a fresh breeze from about N. W. The Fyzulbarry had her N. Easterly storm continuing and veering to E. N. E. It is probable that as the Winifred and Fyzulbarry were only 220 miles apart on this day, the Winifred was just on the outskirts of the storm which evidently lies betwixt them; and as she was running to the Southward she soon got clear of it. The Fyzul Curreem was wholly out of its influence and the Candahar has, as yet, but a strong monsoon gale. I have therefore placed the centre of the Fyzulbarry's storm in Lat. 6° 00' N. Long. 88° 45' E. marking an arrow through the Winifred's position to shew its effect upon her.

29th November.—We have the Candahar with an evidently commencing gale at N. E. and the Fyzulbarry with a furious one at N. E. We have no other bearing or datum whereby to estimate the distance of the centre of this storm which now bore about S. E. from the Fyzulbarry, but we find that it veered rapidly with her to N. N. E. and by 11: 30 p. m. to North; of course as the vessel ran and drifted round the N. W. quadrant. From the best estimate I can make, I should with every allowance place the centre, which bore at noon S. E. of this ship, in Lat. 6° 52' N. Long. 87° 48' E.\* We have no Lat. of the Carena, and of the Bittern only a Lat. of this day!

<sup>\*</sup> It was really in about 6° 00' N., Long. 88° 00' East, by the Log of the John Brightman. See note at the end.

I have printed the abridgment of these extracts, indeed, almost to shew what meagre and disappointing documents we sometimes obtain. We cannot from such data affirm that the Fyzulbarry's and Candahar's storms were the same, and indeed the great size of this circle is entirely I think against the probability that they were, for it would be if completed 600 miles in diameter, and we shall find on the 30th and 1st December that the storm could not have been the same, and we thus obtain distinct evidence of three separate storms at the same time; two in the Northern and one in the Southern Hemisphere.

30th November .- We have first the Fyzulbarry running to the S. S. E. and S. E. and evidently towards the centre of the storm. which does not appear to have been an entirely calm one or at least the ship did not get into it. At 7 P. M. she had the Westerly sea. " rolling up and overpowering the Easterly one," and the S. W. and Southerly gale coming up. She had an observation, though indifferent on this-day, so that we may take her position as within a little to be that of the centre of the storm, and projecting it would give to Candahar a N. Easterly gale at 250 miles distance from the centre; and therefore a moderate, instead of a furious N. Westerly one which she had,) shewing that her storm as before remarked, was certainly a different one from that of the Fyzulbarry. I have then placed the centre of the Fyzulbarry's storm for this day in Lat. 7° 30' N. Long. 87° 30'. E. The Mary Imrie in 12°20' North, though we have not her longitude this day, was doubtless on the N. W. quadrant of the Candahar's storm, and at Madras the high surfand strong current to the Northward are indications of the approaching tempest there. The Vernon we find went to sea, on this day from Madras roads, with a fresh N. N. E. gale at 7 P. M. The Bittern and Carena's logs give us no information for want of Long. but the Winifred's is interesting as showing that though the

<sup>·</sup> And, as it has often struck me, to remark on the absurd practice of keeping a log book without entering the Longitude. It is quite possible that a case might arise in which, at least ignorance of his position, if not of wilful destruction of his vessel might be alledged, if not proved, in a court of law against the master of a vessel through this omission; and his insurance thereby become vitiated in case of an accident. 'The private " Chronometer book" of a Captain would barely be called a legitimate document when the book which should contain the vessel's place at noon is blank. buy we and to page it her A



centre of the Fyzulbarry's storm and that of the ships in the Southern Hemisphere were sixteen degrees of Lat. apart on this day, there was still about the equator considerable atmospheric disturbance, with heavy streams of wind from the Westward, agreeing with what we should look for as the general effect of the Southern and Northern halves of the storms in each Hemisphere. The Winifred's Bar. also, and it was evidently most carefully observed, is yet about two tenths below the averages before and after the bad weather which she expeperienced. At midnight of this day we have the Candahar with a heavy gale at N. W. and the Mary Imrie with a terrific one at N. N. E. and taking the last ship to have made about a South course, we find by projection that on the 30th, at midnight the centre of what I shall now on this evidence call the Candahar's storm was in about Lat. 10° 45' N., Long. 65° 0' East, the centre passing near the Candahar about noon the following day; the Mary Imrie scudding to the Southward on its Western side.

1st December .- We have first the Fyzulbarry, which ship had run with her Southerly gale 150 miles to the N. N. E. from noon 30th to noon of this day with the winds between S. S. W. and South, raising her Bar. as she increased her distance from the centre of the storm from 29.30, at 7 A. M. to 29.80 at 10 P. M. or half an inch in fifteen hours; and obtaining also moderate weather at midnight. I have before shewn on the 29th and 30th November that this ship's storm must have been a separate one from that of the Candahar, and it will be presently seen that it clearly was so. . The loose report of the Niagara informs us of nothing more than that she had a rotatory storm about in Lat. 10° Long. 87° of which we may suppose the strength was about noon on this day, and that she was not far from the centre of it; drifting or running round the S. Eastern and North Eastern quadrants of it, if indeed the expressions used do not mean that she had a shift of wind; she would then at all events, if not in the centre, be on the Eastern side of it; so that taking the Fyzulbarry's and this to be the same storm we find that it may have travelled up to the N. b. Westward about 150 miles, or something less, in this 24 hours, and to this the run of the Fyzulbarry 150 miles to the N. b. E. but carrying always a Southerly wind, lends much probability. However the Niagara's position and times of the wind, &c. are so loosely given

that we can only mark this as an approximation. Her rapid change of wind, however, and her distance from the Candahar on this day, which was nearly, or quite, three degrees of Long. exclude the idea of its being the same storm, and I have placed its centre, approximately, close to the Niagara in Lat. 9° 55' N. Long. 86° 55' E.

We now come to the Candahar, Mary Imrie and Vernon on this day, and here we must first remark on the Candahar's position which must be I should think erroneously given,\* for she was lying to with a tremendous heavy gale from North Westward veering at one time to N. by E. and again to N. W. by W. and yet she has made nearly a Northerly course! This is of course impossible, unless we suppose her to have been carried as far to the West by the storm wave as she was drifted to the East by the wind and storm current, both of which tended to carry her to the East and E. S. E. and her position indeed on this day can but be an estimated one: I did not observe this at the time I made the extract, and there may be some clerical error of my own. It is now too late to rectify it, and we must therefore allow that one way or the other there is an error between these two days. Vernon's position was certainly correct but then she had only a "strong breeze" with her Barometer at 29.68. and we cannot thus allow her to have been in the storm though close to the outskirts of it. The Mary Imrie was running free and had an observation, so that her position may be taken as nearly correct, but we have unfortunately the wind but loosely given as veering "to the Westward" (from the N. N. E.) after noon. We may guess it to have been about North or to the Westward of it, at Noon which placing the Candahar, somewhat further to the Eastward, if we please, will give us a spot in about Lat. 10° 18' Long. 84° 2' E. as the approximate position of the centre of this storm on this day which was evidently passing the meridian of these ships and close to the Candahar, and this apparently on a track to the Southward of West.

The difference of their positions indeed is but 28 miles, an error which might easily occur with the Candahar, having no observation. The repeated shifts of wind from N. W. to S. W. may be accounted for very simply, by reflecting that when near to or in the central space, there are many causes such as irregular blasts, storm wave and cur-

<sup>\*</sup> Or that of the day preceding may be so ?

rent,-the ship's own run or drift &c .- to induce these irregularities; and we find that as the centre passed on and she fell into the S. Eastern quadrant of the storm, she again experienced it blowing a hurricane from S. W. shewing that (as she had run a little to the North) she had been on the Southern side of the central space; of whatever extent this was. It is indeed I think most probable that on this day she was not to the Northward but the Southward of the Mary Imrie's position. Both ships were probably very near to, though they did not see each other. The Vernon's position gives a radius of \$10 miles, or a diameter of 220, for this storm for this day, and we are satisfied that it could not be the Niagara's or Fyzulbarry's, the Niagara being evidently close to the centre of hers. I shall remark on the 2nd, on the Madras and Ceylon reports for this and the next day...

On the 2nd December .- We find that the Mary-Imrie on this day while running down say about 80 miles\* to the South and South Eastward, before a terrific hurricane veering from the N.N.E. to the N. Westward, had her Bar. always falling, and was at 2 A. M. in another, and of course a different centre from that of the Candahar's storm of the day proceding, for she was now perhaps 100 miles from that ship, This centre gave her another hurricane at S. S. W. and Capt. Boyd's description of the sea is exactly what we should suppose the effect of a second storm passing over any part of the sea left by one just preceding it to be. I think it most probable that this second hurricane may have been the Niagara and Fyzulbarry's storm and have so marked it; supposing the Mary Imrie to have been in Lat. 9° 20' and Long. 85° 00' and the centre a little to the Westward of her.

The Candahar, on this day had run to the North and N. W. round the Eastern and North Eastern quadrants of her storm, while the Vernon, which ship had stood to the E. S. E. with the N. Easterly gale of the preceding day, had a smart shift of wind of four points, as the centre approached her, and a fall of 0.14 in her Bar. As the storm however passed to the South of her, and she was bound to the Northward, she was soon out of its influence. We find also on this day that a Westerly and N. Westerly storm prevailed at the stations on the North end of Ceylon. To obviate confusion, I have preferred consi-

<sup>\*</sup> We must take this by guess having no log of the distance.

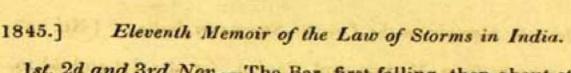
dering the reports from Madras and Ceylon, for the 1st and 2d together.

First, in reference to the general effects of the storm on the Coast: we shall observe on inspecting the chart, that there are at least two storms on this day, the Mary Imrie, Niagara and Fyzulbarry's being one, and the Candahar's another, travelling up on a N. Westerly course more or less curving, apparently to the Westward, as they approach each other,\* and this bending by the way is a very remarkable feature. The average distance of the centres of the two storms from the coast we may call about 31 degrees. dahar's storm we know to have been of very small extent (taking her position on this day as correct) as it is determined by the Vernon's which is certainly exact within the trifling distance arising from the defects of all sobservations in bad weather. The Mary Imrie's storm we have admitted to be the Niagara's on this day, and we shall find that this projected will bring the circumference of her storm to within two degrees of the North end of Ceylon, and that the joint effect of both vorticæ would be to create a Northerly, and N. Westerly wind, stream, or gale if their influence extended so far; and they ought moreover to create a Northerly and N. Easterly stream at Madras. Now we know that at Madras which is as far to the N. W. as Kayto and Paumbum are to the West, and W. S. W. of the centres of the 1st and 2d, there were also the indications of an approaching storm in the increasing surf and slight fall of the Bar. + as well as the North current, (see remarks on Capt. Biden's report,) and that the wind was from the North and North East on the 2d, and to 4 A. M. on the 3rd, changing afterwards to S. E. From the effects of the ranges of hills (and even mountains) between Madras and the north end of Ceylon, it is impossible to go farther than to indicate generally what the average effects of a storm would be, as every separate spur and range would produce necessarily some local effect. On the coast we have the effects of the storm current in the "North current," and we have finally within these three days:---

it may be to it, that the Logs of the Carena and Bittern relate.

<sup>·</sup> The Colonel Burney's storm may have been a third for anything we know, and

<sup>†</sup> I should consider this slight fall of the Bar. as some evidence in favor of the relation of the two storms and their bending to the Westward which I have supposed.



1st, 2d and 3rd Nov .- The Bar. first falling, then about stationary, and lastly rising again to its former level as if it had just felt the storm, but no more. The indications at Ceylon on the 2d are clearly those of a storm passing over the South extremity of the Peninsula, and probably, if we had any reports from Tranquebar or between it, and point Calymere we shall find that there really was a shift thereabouts, while the rapid veering at the station of Paumbum was taking place. It is possible that the tendency of the whole aerial impulse, like a storm or tide wave, was as usual, to force its way through the Paulgatcherry pass, as shewn in my eighth Memoir.

I must not conclude this part of the summary without noticing the remarkable fact of the Mary Imrie's Bar. remaining so high, though fluctuating greatly, in the first storm; and in the second falling to 29° 25. It will be noticed and for the present I should suppose this is the cause of this anomaly, that she was at the time her Bar. stood so high, in the N. West quadrant (having the wind at N. N. E.) of her first storm, and she had thus both the effect of the verge of the coming storm which sometimes and perhaps always, raises the Bar. and also that of the monsoon from the N. Eastern part of the Bay. The Ariel's storm in my sixth Memoir, Vol. p. 686 of Journal is another instance in which this seems to have occurred with two storms coming up in different directions and both at a considerable angle to the monsoon. We find from the Vernon's log that it was blowing a fresh monsoon from the N. N. E. on this day. The oscillation I have frequently remarked upon, and if Capt. Boyd had had a Sympiesometer on board, no doubt the warning would have been still more distinctly given.

Extract from the Log of the Ship EMILY, Captain Anderson from Shields to Calcutta, reduced to Civil Time.

The following log reached me after the chart was lithographed; it will be seen by it that the Emily was skirting the Fyzulbarry's storm to the Eastward on the 27th and 28th, as the Winifred was to the Westward. From the heights of the Emily's Bar. we may infer that she had really no part of the vortex but rather a heavy monsoon

<sup>.</sup> See Col. Reid quoting Mr. Redfield's explanation of this phonomenon. Second edition p. 514 to 519.



setting in, though on the 27th she is near enough to the Fyzul-barry's place to allow us to suppose that both were partaking of the strong Easterly stream of wind which prevailed thereabouts on that day.

The Emily was on the 6th November 1843, at noon, in Lat. 3°.40 N. Long. 91°.34' (to 54' by Lunars) East. Bar. 30.3 Ther. 85°, standing to the N. N. E. with variable N. N. W. to N. W, and N. Easterly breezes to midnight.

27th November.—Increasing breeze N. E. b. E. to noon, when Lat. 5° 28. Long. 91° 46′ and 92° 6′\* Bar. 30.5 Ther. 83°. P. M. strong breeze East and sudden squalls. Ship standing 6 and 7 knots to the N. N. W. and N. ½ W. Midnight the same, and increasing with incessant rain.

28th November:—A. M. Thick cloudy weather, continued rain and heavy squalls. Wind 2 A. M. E. S. E.; at 6 East. Noon Lat. Obs. 7° 42' N., Long. 91° 38' E. Bar. 30.5 Ther. 81°. P. M. Increasing breeze and a high confused sea, wind E. b. N. Midnight heavy squalls.

29th November.—A. M. strong gales East with tremendous squalls and a continuance of heavy rain, 8 A. M. wind N. E. b. E. Noon Lat. Obs. 10° 17′ Long. 91° 3′ +91° 40′ by 8 P. M. finer; out all reefs. Wind N. E. b. E. and N. E.

30th November.—Increasing again from the N. E., noon Lat. 14° 13' N. Long. 89° 40' E. Bar. 70.00 Ther. 83°. P. M. hard gales East to N. E. with tremendous heavy squalls and a high confused sea. Midnight, wind E. b. N. more moderate.

1st December.—A. M. Variable weather with squalls, wind about E. N. E. Lat. 14° 13′ N., Long. 89°44′ Bar. 30.10. Ther. 83° P. M. squally and torrents of rain. Wind about E. N. E.

2d December-Moderate from N. E. Lat. 15° 35' N. Long. 89° 22' E.

# Concluding Remarks.

One of the first peculiarities which strikes us in considering the storm in the Southern Hemisphere, is its almost stationary character,

<sup>\*</sup> The several Longs, apparently Lunar brought on by Chr.
† 91° 30' is probably meant here, giving a mean Long, of 91° 35' for the ship's place.



as compared with the storms we have been accustomed to consider.

We find it moving only,

Miles.

				TANTICS.
From th	e 26th to	the 27th	Nov.	60
	27th	" 28th	,,	32
AL STORES	28th	" 29th	25	135
THE PARTY	29th	,, 30th	,,,	47
	30th	,, 1st	Dec.	57
Or in fi	ve days,		gatismes y	.331
Giving :	an avera	ge of per 1	Day,	661/5
Or per /	our not	more than		23

and this also on a singularly curved track.\* This slow motion of the storms here, if future researches should show it to be usual, will be a new and curious fact, and will explain, not the frequency of their occurrence hereabouts, but the frequency of their being met with in the track of the outward-bound ships and on the verge of the trade.†

With respect to the track itself; we have, I think clearly established that it must first have moved up from the S. E. to the N. Westward and then curved away to the S. W. The exact position of the ships, is of course liable to great errors after three, four, or five days of bad weather or hurricane; but still these errors are reducible to moderate limits, and when we have ships on both sides of the storm, or ships on one side and others at or close to the centres, we are very sure that our positions for these points from day to day cannot be very far wrong; and certainly not far enough to invalidate our general conclusion as to the extent of the space passed over by the storm in these five days.‡ There are some other matters worthy of note which I take here

+ Col. Reid remarks p. 241 that the Albion's storm was apparently almost stationary or forming.

<sup>\*</sup> The true track was in all probabity a sharp curve passing near the different points.

<sup>‡</sup> See postcript for an extraordinary confirmation of the truth of our work, and of these remarks, which were written months before the intelligence there given reached me.

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20 Eleventa idemoti on the Law of Storms in India. [No. 157

in their natural order to direct the attention of future observers to them, and these are:

Atmospheric signs indicating the approach of the storm. The most remarkable of these is the warning noise noticed by Captain Rundle p. 32, to which I have there appended a note referring also to Journal Vol. XI. p. 1000 for another instance where it was carefully noted, and I have heard it also on other occasions; though not noting it on the spot I will not refer more particularly to them. It is exactly that sort of noise which we hear, and read of, in old houses in England, and with which most of us are acquainted; but we there attribute it to the noise of the wind in the chimneys, or amongst the trees, or, on board a ship to the rigging: yet here there can be no doubt of its being distinctly heard at sea as the "roaring and screaming" of the wind in a tyfoon or hurricane certainly is. My present theory to account for it is this. I suppose the storm to be really formed and to be "roaring and screaming" at say 200 miles' distance, and that the noise, if not conveyed directly by the wind, may be so reflectively from the clouds, as in the case of thunder claps. A noise is known on some parts of the coast of England by the name of "the calling of the sea" as occurring in fine weather and announcing a storm, and also in mountainous countries. All these may be connected, and seamen may render great service to science and to themselves by noting these curious phœnomenæ.

The sickly and dancing appearances of the stars, as noticed by Captain Rundle is also remarkable but more easily explained, as we may suppose the sickly (hazy) appearance to have arisen from the atmosphere being loaded with vapour half condensed, and the "dancing" to be occasioned by their appearing at times through spaces and intervals somewhat less loaded with vapour wreaths. If I am not mistaken the fixed light of a Light House has sometimes this dancing motion, by the effect of small wreaths of vapour passing before it, as at the breaking up of a fog? The vibrating appearance of distant objects seen through a telescope in the morning in tropical climates and owing to the different rarefactions of strata of air is familiar to us all.

Phosphoric flashes in the water, are common enough in fine weather, but are nevertheless well worth noting; we do not yet know



if more common in particular parts of the ocean, or at particular seasons, or in particular weather than at others.

The appearances of the clouds are of special interest, for there can be no doubt that many indications can be drawn from them of great value, both to the careful mariner and to the man of science. The remark of Captain, Handley p. 14, shows the storm was forming to the eastward of him, and those of Captain Rundle, both as to appearance and motions are exceedingly interesting, as showing that there were different currents prevailing above, probably from one part of the storm or vortex over-reaching another.

The kind of lightning described by Captain Rundle, pis also worthy of great attention: should this be found always to precede these storms in particular latitudes it would be, in addition to other signs, of great utility.\*

The states of the Barometers and Sympiesometers of the various ships both as relates to the approach of the storm, and to the manner in which the instruments were affected every time the ships bore up, and, tempted no doubt by the fair winds, ran down to the S. Westward and thus neared the centre, is of peculiar interest; and it is highly worthy of . remark that not one of them thought of running to the E. N. E. or even N. E. while the wind and sea admitted of it, which was the true course to steer, as may be seen by the chart and storm card. They would thus have raised their Barometers and should have then hauled gradually to the Southward, and South-westward, and so have sailed round, and eventually out of it. In this point of view the logs of the Fleming, Ainslie, Futtle Rozack, and Flowers of Ugie are remarkable, and most instructive lessons for us. These ships will almost indeed, to the eye of the studious seaman, appear to be manœuvring for the purpose of proving the value, the truth,-and I will add the beauty, - of the Law of Storms.

\* I have found, while correcting this page, in the press a single instance in which this remarkable kind of lightning is described. It occurs in one of the replies to a circular addressed at my suggestion by the Hon'ble the Court of Directors E. I. C. to their retired Officers, requesting information on storms in the Indian Ocean and China seas, by Captain Jenkins, then commanding the H. C. Ship City of London: who says, speaking of an approaching hurricane in March 1816, in Lat 12° to 18° South Long. 78° to 76' East, for which, warned by his Bar., he was preparing. "At 7, the appearance of the atmosphere altered, constant vivid lightning, resembling in the distance the Northern lights with frequent hard gusts of wind," &c. We are not to suppose from its being so unfrequently noticed that it is therefore of unusual occurrence; seamen are so accustomed to lightning that they rarely take the trouble to describe it.



# In the Northern Hemisphere.

We have principally to remark here on what we may call the "generation of separate storms" at short distances from each other so analogous to what certainly occurred in the Calcutta storm of June 1842, though we might there suppose it to have been occasioned by the influences of the land, as hills, valleys, &c., but it would now appear that the state of the atmosphere which induces one rotatory storm often disposes, or gives rise to, others, just as after certain states of summer weather in Europe, we hear of a succession of thunder storms all over a large tract of country.

Thus we find that when the Fyzulbarry's storm (a true rotatory one) had travelled up from the S. Eastward two or three days, 27th or 28th to the 30th, another storm appears to have commenced at four degrees' distance with the Candahar, which we trace accurately enough through two days, as travelling to the W. S. W. and if our conclusions be correct as to the Niagara and Mary Imrie, that the Fyzulbarry's storm when approaching this of the Candahar's, curved away to the W. b. S. This looks strange enough, but whatever are the causes of them, the dust whirlwinds on the plains of India, of which I have seen as many as four or five at a time, certainly do influence (repel) and alter each others tracks. We do not know if these arise from the same cause, but it is the only analogous fact that I am acquainted with, and the scientific reader will judge from the data set down whether he thinks they are sufficient to entitle us to lay down the tracks which I have here given. There is I think no doubt of the storms being altogether separate ones.

It is remarkable that all these forces and storms seem to have been blended so as to produce one about Palks' Passage, evidently travelling to the Westward also, or rather generated like the other in advance of those raging in the bay, for we find that the Ceylon storms all began on the 1st, when the nearest centre, that of the Candahar's storm was at least at three degrees of distance; and it could not be part of this, for the Vernon's position limits it to the N. W. within a much more circumscribed circle, and I am therefore inclined to believe that at sea as on shore, independent vortexes arise like independent thunder storms.

# Postscript.

In the preliminary notice to this Memoir, I announced that I had obtained from the Mauritius the detail of what I may call a beautiful expe-

\* "It is possible that one storm may deflect another says Col. Reid," p. 433, 2nd Edition of his work.

riment, in which a vessel called the Charles Heddle was fully proving for us there, the truth of the researches we were making here. The following is the newspaper notice of it, written by myself, which will fully explain enough of this remarkable, or rather wonderful, fact and coincidence of actual experiments with theory and with resurches going on at thousands of miles distant.

"I have just received from Capt. Royer, the Master Attendant at Mauritius, who, like every one else, was-much staggered by the report of the Charles Heddle's circular sailings for so many days in a hurricane, a number of logs, and with them her's, which he has taken the trouble to copy himself that there might be no mistake about it, and you will learn with pleasure that I have fortunately just completed a Memoir now printing, of which the evidence leaves no manner of doubt as to the possibility of a fast sailing ship, that could scud well. having really done what the Charles Heddle has; and it teaches us moreover, by two perfectly independent storms, at more than a year's distance of time, and in quite different parts of the Southern Indian Occean, that there are storms of great intensity, lasting for long periods (in both cases five whole days) and which have yet so slow a progressive motion that one might, comparatively speaking, almost term them stationary storms. If you like to print this, for it is advantageous now and then to draw attention to the subject, and to show how much yet remains to be learnt, particularly with respect to the storms of the Southern Hemisphere, here are some of the data as briefly as I can give them.

First, from the accompanying chart (of this Memoir) you will see that between the 26th of Nov. and 1st Dec. 1843, and between latitudes 5° 30' and 11° South and longitudes 83. to 89° East, there was a hurricane raging for the whole five days, which, traced by the logs of many ships, appears only to have travelled in that time, from point to point of its centre, about 255 miles, or allowing for the curves about

a degree a day only.

The Charles Heddle, by her log now before me, appears to have scudded from the 25th to the 28th February, 1845, for five whole days round and round in a Hurricane circle! during which time she ran upwards of thirteen hundred miles; the wind made with her five complete revolutions, and from calculations derived from the distances and shifts of wind and the positions of the vessel, to have been on an average about 50 miles from its centre; which was slowly moving on, like the one of which I send you the chart, to the southwestward, at not more than three miles an hour; and the direct distance

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made by her, from point to point, was but 354 miles. Now, if like the Charles Heddle, any of our ships in this November storm had scudded the whole time, they might undoubtedly have made much such a set of circles as you see on my chart, and yet have made but a trifle of direct distance in the whole five days; and in a word we can, so to say, prove by this Memoir that there is nothing at all of romance in her account, and that she has been performing for us a very curious and beautiful experiment; as cleverly as if she had been sent out to do it! The investigation of this and the other Mauritius storms for which I have data, will, I.doubt not, lead to other equally important and curious facts in that dangerous quarter of which seamen as yet know so little, but the difficulties and trouble of obtaining log books are positively incredible."

The value of this experiment as a proof of the circular theory generally, if it requires any now, and of the truth of our researches I need not dilate upon. In a future Memoir I trust to be able to bring forward a great deal more in relation to the tracks and other peculiarities of the storms of the Southern Hemisphere.

Note .- While the last sheets of this Memoir were passing through the press, I obtain-Note.— While the last sheets of this Memoir were passing through the press, I obtained by the kindness of Capt. J. Viall, the log of the ship John Brightman, just arrived from the Mauritius, and which ship it will be recollected was seen by the Fyzulbarry on the 28th November. (page 14.) being bound to the Southward. This log, while it corroborates exactly the general direction of the track of the Fyzulbarry's storm, enables us to correct the place of the centre for the 29th, which being laid down from the log of a single ship, without observation, is necessarily subject to error, though here as so frequently before, the error does not amount to much, and all the relative data for practical purposes on board either of the ships in the storm, would have been the same:

practical purposes on board either of the ships in the storm, would have been the same: as for the management of a ship, what is required to be known, is the bearing of the centre of the hurricane, and the track of the storm, provided there be ample sea room.

From midnight 27th November.—The John Brightman had heavy squally weather and winds from East to E. S. E., and N. N. E. She was at noon in Lat. 9° 48′ N., Long. 87° 44′ E., Bar. at 29.63. (having been at 29.71. at noon 26th, since which time she had run down South, and S. b. W., 138 miles.) P. M. wind E. b. S., and E. S. E. to midnight, when it was a strong gale with a tremendous cross sea, the vessel having always run to the South and S. b. E. to midnight 56 miles. Bar. 29.58.

28th Nov.—Wind and weather the same, 7 A. M. wind E. N. E., Noon strong gale and high sea, Lat. indifferent Obs. 7.48 N., Long. 87° 48′ E., P. M. wind E. N. E., East, and E. S. E. to midnight when Bar. 29.41. Ship's run from noon between S. S. E. and South 53½ miles.

South 531 miles.

South 53½ miles.

29th Nov.—Hard gales, squalls, and sea continuing as before from East, E. S. E., and E. b. N., Noon more moderate, but weather looking very suspicious, Lat. Acct. 6°03′ N., Long. 87°58′ East. Bar. 29.60. Ther. 83°. Ship's course from midnight to noon South to S. S. E., 51½ miles, p. M. wind veering from E. b. N. at noon, to N. E. b. N., and N. W. to West, and by 4 p. M. to W. b. S., light variable winds and thick weather. At 2 p. M. breeze increasing, thick unsettled weather, Bar. 29.24. At 4 p. M. fresh gales W. b. S. hove to. At 8 heavy gales and vivid lightning with rain and squalls, Bar. 29.28. Midnight Bar. 29.20.

30th Nov.—A. M. to noon hove to. Bar. rising to 29.36.; at noon Ther. 83°, wind W. S. W. Lat. by indifft. Obs. and Acct. 5° 46′ N., Long. Acct. 88° 31′ East., p. M. Wind S. W. and at 5 p. M. S. S. W., weather moderating. Midnight Bar. 29. 49. Wind South at 5 p. M., and S. S. E. by noon 1st December when Lat. 5° 19′ N., Long. Chr. 90° 16′ E. Ther. 84°, Bar. 29.59.



# Proceedings of the Asiatic Society for the month of JANUARY, 1845.

(And at its supplementary Meeting of 1st February, 1845.)

The monthly meeting of the Society took place at the usual hour, at the rooms, on Tuesday evening, the 14th January.

The Rev. Dr. Hoberlin, in the Chair.

The following gentlemen, proposed at the last meeting, were ballotted for and declared duly elected.

F. Boutros, Esq. Dehli College; A. Christopher, Esq. La Martiniere; S. B. Bowring, Esq. C. S.; John Ward, Esq. Civil Engineer; E. Blyth, Esq. Associate Member.

And the following new members were proposed: Major Lawrence, Resident, Nepal, proposed by H. Torrens, Esq. seconded by the Sub-Secretary; Rev. Peter Barbé, proposed by H. Torrens, Esq. seconded by the Sub-Secretary.

The Society's Office-bearers for 1844 were unanimously re-elected for 1845, and the following gentlemen were added to their number,—

As Vice-President, Lieut. Col. W. N. Forbes, B. E.

As members of the Committee of Papers,

W. Seton Karr, Esq. C. S.

W. B. O'Shaughnessy, Esq. B. M. S.

On the motion of the Secretary, H. Torrens, Esq. seconded by F. G. T. Heatley, Esq. it was resolved,

That the following gentlemen be requested to act as Corresponding Members of the Committee of Papers,—

V. Tregear, Esq.

A. Sprenger, Esq. M. D.

Captain Beileau, B. E.

G. G. Spilsbury, Esq. M. D.

Lieut. Phayre, B. N. I.

Lieut. Tickell, B. N. I.

Captain Cunningham, B. N. 1.

And that the Committee of Papers be empowered from time to time to add to the foregoing the names of such gentlemen as it may deem likely to assist in its labours.

It was further resolved, that the hour of neeting in future be half-past seven instead of half-past eight, r. M.

Read the following list of books.

Books received for the Meeting of the Asiatic Society, Tuesday, January 14, 1845.

Presented.

The Holy Bible in Hindustance, by Rev. Mr. Long.

The New Testament in Bengalee and English, Matthew to John, by do. do.

Hindustanee Pentateuch, by the Rev. J. Long.

Hindee New Testament, by do. do.

New Testament in Bengalee, by do. do.

Psalms of David in Bengalee, 2 copies, by do. do.

A number of Bengalee tracts, by do. do.

Usher's Works, Vols. II. to XIII. by the Dublin University.

Livius ed. Walker, 7 vols. by do. do.

Wall on the Antient Orthography of the Jews, 3 vols. by do. do.

H. Lloyd's Treatises on Light and Vision, I vol. by do. do.

Lectures on the Wave-Theory of Light, I vol. by do. do.

B. Lloyd's Mechanical Philosophy, by do. do.

Todd's Discourses on the Prophecies relating to Antichrist, I vol. by do. do.

Proceedings of the Irish Archaeological Society, by the Society.

Journal of Great Britain and Ireland, No. 13, by the Society.

Proceedings of the Royal Asiatic Society for 1844, by the Society.

Bullétin de la Société de Géographie. Tome 20. Paris, 1843. By the Society.

Journal of the Agricultural and Horticultural Society of India, vol. iii, part iii, by the Society.

Specimen e Litteris Orientalibus, exhibens Taalibii Syntagma. Auct. J. J. Valeton, by the Academy of Leyden.

Edinburgh New Philosophical Journal, No. 73, April to July 1844, by the Editor.

Calcutta Christian Observer, January 1845, by the Editors.

North British Review, No. 1, May 1844, by the Rev. Dr. Wilson.

Akademischer Almanach der Baierischen Akademie der Wissenschaften für das Jahr 1844, by Professor v. Martius.

Oriental Christian Spectator, for December 1844, by the Editor.

Documents et Observations sur le Cours du Bahr el Abiad, par M. D'Armand.

Second Voyage ditto ditto, two copies.

Collection Géographique de la Bibliothèque Royale.

Glossarium Sanscriticum, auct. F. Bopp. Fasciculus II. Berolini, 1844, by the author.

Exchanged.

Journal Asiatique, No. 13, April, 1844.

The Athenaum, Nos. 884-888, 19th Oct. to 2nd Nov. 1844.

Purchased.

Haji Khalfæ Lexicon, I vol. printed for the Asiatic Society by the Oriental Translation Fund.

Lettre sur l'utilité des Museés ethnographiques, par Ph. Fr. de Siebold, Paris, 1843.

Journal des Savants, June, 1844.

Philosophical Magazine for July, No. 169. Supplement to D. D. No. 163, and for Aug. 1844, No. 164.

Lardner's Cabinet Cyclopædia, History of Greece, by C. Thirlwall, vol. 8.

It was resolved, that the Society subscribe to the North British Review.

Read the following letter from the Librarian of Trinity College, Dublin :-

To the Vice President of the Asiatic Society of Bengal.

"SIR,—I am directed by the Provost and Senior Fellows of Trinity College, Dublin, (in pursuance of the answer which they commissioned the Vice Chancellor of the University of Dublin to make

### JAN. 1845.] Proceedings of the Asiatic Society.

to your letter to him, dated last September) to forward to you for presentation to the Asiatic Society of Bengal, the works noted on the other side.

> I have the honor to be, Sir, Your obedient servant,

CHARLES WM. WALL,

Trinity College, Dublin, July 8, 1844.

Librarian.

iii

Archbishop Usher's works, edited by Charles R. Ebrington, D. D. Regius, Professor of Divinity in the University of Dublin, Vol. II. to XIII. inclusive (Vol. I. XIV. &c. not yet published) An examination of the Ancient Orthography of the Jews. By Charles William Wall, Senior Fellow of Trinity College, and Professor of Hebrew in the University of Dublin, Vols. I. II. and III. Discourses on the Prophecies relating to Antichrist in the writings of Daniel and St. Paul. By

James Henthron Todd, M. R. I. A. Fellow of Trinity College, Dublin.

A Treatise on Light and Vision. By the Rev. Humphrey Lloyd, M. A. Fellow of Trinity College, Dublin.

An Elementary Treatise of Mechanical Philosophy. By Bartholomew Lloyd, D. D. Provost of Trinity College, Dublin,

Lectures on the Wave Theory of Light. By the Rev. H. Lloyd, D. D. Livius, a John Walker, 7 Vols.

Read the following letter from the Librarian:

To H. Tonnens, Esq. Secretary, Asiatic Society.

SIR,-I have the honor to submit to you an alphabetical list of the books received during the past year into the Library, together with the account sales of the Oriental publications, and an account of the publications delivered, sold and in store, from the 31st of July 1843, to the 31st of December 1844.

From the alphabetical list it appears, that the number of works received, is nearly the same with that of the preceding year.

I beg, however, to observe, that most of these works bear upon Natural History and Natural Science in general, while a few only are connected with Oriental Researches. Although it is very desirable, that the library of the Asiatic Society should contain standard works on natural sciences, the Oriental division, which is so closely linked with the objects of the Society, should not be neglected. I therefore beg to propose, that the Society may be pleased to fix an annual sum of some hundred rupees to enable the Librarian to improve the collection of Oriental works in the Library.

I have the honour to be, Sir,

Your most obedient servant,

14th January, 1845.

E. ROER.

Abstract of the List of Books received into the Library during 1844.

Academy of Natural Sciences of Philadelphia. Transactions, vol. ii. January and February 1844, No. 1.

Ditto ditto Proceedings, Nos. 30-33.

Agricultural and Horticultural Society of India, Journal, vol. 2, Nos. 11-12, vol. 3, Nos. 1-2.

Annals and Magazine of Natural History, Nos. 77-83 and Nos. 85-89.

Athenæum, Nos. 855-858, and Nos. 861-885.

Ayeen Akbery, or the Institutes of Akber, translated by Gladwin, 2 vols.

Bombay Branch Royal Asiatic Society. Journal, No. 7, 1844.

Botanical Society of London, 1839. vol. i.

British Association for the Advancement of Science. Report for 1843.

Calcutta Christian Observer, vol. v. 1844, from January to December, 12 Nos.

Calcutta Literary Gleaner, vol. ii. Nos. 10-11.

Classical Museum of London, 1844, Nos. 2-5.

Forster, (C.) Historical Geography of Arabia. London, 1844, 2 vols.

Gayangos, (P. de) History of the Mahomedan Dynasties in Spain, vol. ii. London, 1843.

General Report on Public Instruction in the Bengal Presidency, for 1842-43, 1 vol.

Geological Society of London, List of the Members for 1843.

- Proceedings, vol. 14, No. 96, and Index to vol. 3, No. 93.

Golingham, (J.) Meteorological Register at Madras.

Goodwyn, (H.) Memoir on Iron Roofing, Calcutta, 1844.

— Ditto ditto plates.

Grey, (Hamilton) History of Etruria, part 1, 1 vol.

Griffith, (W.) the Palms of British India.

Heeren, (A. H. L.) Manual of Ancient History. Third edition. Oxford, 1840.

Jameson's Edinburgh New Philosophical Journal, Nos. 69-72.

Jeffroy, (A.) Notes on the Marine Glue. London, 1843, Pamphlet.

Jerdon, Illustrations of Indian Ornithology, No. 1, Madras 1843.

Johnston, (K. M.) Report of the Secretary of the Navy.

Jones, (J. T.) Brief Grammatical Notices of the Siamese Language.

Lardner, (D.) and Walker Cabinet Cyclopædia. Electricity, vol. ii. 1844.

London, Edinburgh and Dublin Philosopical Magazine and Journal of Science, vol. 22, Nos. 147, 148; vol. 23, Nos. 159, 150, 153, 185; vol. 24, Nos. 156, 161.

M'Clelland (J ) and W. Griffith, Calcutta Journal of Natural History, 4 vols. Nos. 1-16, and Nos. 17, 18.

Madras Journal of Literature and Science, No. 30, June 1844.

Magnetic Observations from the Observatory of Bombay.

Naturalist's Library, Ichthyology, vol. 6, British Fishes, Ornithology, vol. 14, British Birds, 2 vols.

Napier, (W. F. P.) History of the Peninsular War, vols. 3-5.

Niebuhr (B. G.) History of Rome, vols. 4, 5.

Oriental Christian Spectator, vol. 4. No. 12. Second Series, Nos. 1-11.

Penny Cyclopædia, vols. 25, 26.

Pidaington, (H.) Horn-book of Storms for the Indian and China Seas, 1 vol.

Friehard, (J. C.) Natural History of Man, 1 vol.

Ditto ditto Researches into the Physical History of Mankind, vols. 1-4.

Ram Chunder Doss, General Register of the Bengal Civil Service, from 1796-1842.

Register of the Singapore Tides.

Royal Asiatic Society of Great Britain and Ireland, 1843. Annual Report of the Council.

Royal Geographical Society of London. Journal, vol. 14, part 6, 1843.

Royal Irish Academy. Transactions, vol. 19, part ii.

Ditto Proceedings, 1841-42, part 6; 1842-43, part 7.

Royal Society of Edinburgh, vol. 15, part 2nd, 3rd Series.

Royal Society of London, Philosophical Transactions, from 1838-43, 6 vols. and part i. for 1844.

Shea, (and Troyer) Dabistan, or School of Manners, translated from the Persian.

Sketch of the Systems of Education, moral and intellectual, in practice at Bruce Castle School, Tottenham, London, 1839, 1 vol.

Slane, (Mac G. de) Ibn Khalikan's Biographical Dictionary, translated from the Arabic, vol. ii, Paris 1843.

Smith, (A.) Illustrations of the Zoology of South Africa, Nos. 18, 19.

Society of Arts, Transactions, vol. 51.

Society for the Encouragement of Arts, Manufactures and Commerce, premium for the sessions 1843-44.

Somerby, (B.) Thesaurus Conchyliorum, or figures and descriptions of shells. 1842-43.



# JAN. 1845.] Proceedings of the Asiatic Society.

Somerby, Conchologia Iconica, a Repertory of species of shells, pictorial, descriptive. London, 1843, 3 vols.

Taylor, (G. P. G.) General Catalogue of the principal fixed stars, from observations made at Madras in 1830-1843.

Troyer, Vide Shea.

Vetch, Inquiry into the manner of establishing a steam-navigation between the Mediterranean and Red Seas, London, 1843.

Wiseman, Letter on science and revealed religion.

Wood, (W.) Catalogue of a valuable collection of books in Natural History, arranged in classes according to the Linnean system.

Zoology of the voyage of H. M. Ship "Sulphur," during the years 1836-1842.

French.

Annuaire du Burean des Longitudes, 1842, 1 vol. \*

Accroissement de la collection Géographique de la Bibliothèque Royale, 1841.

Bureau des Longitudes. Connaissance des temps des movements célestes pour, 1843-45, 3 vols.

Florival, (P. C. V. de) Moise de Khorene, texte Armemien et introduction Française, 1844, 2 vols.

Humboldt, (A. de) L'Asie Centrale. Paris, 1843, 3 vols. Journal des Savants, Paris, April, 1843 to Aug. 1844.

Jomard, Notation Hypsométrique, P.

Mas, (S. de) Mémoire Sur l'idéographie Macao. 1844-P.

Ditto ditto, Vocabularie l'idéographique, P.

Quatremère Histoire des Sultans Mamlouks de l'Egypte. Tom. II, Paris, 1842.

Rafn, (Chr.) Mémoire sur la Découverte de l'Amerique. Copenhagen 1843, 1 vol.

Roberts, (G.) Voyage de Delhi à Bombay en 1841, 1 vol-

Societé Asiatique, Journal 3 me. Série. Nov. Dec. 1842, Tome 4. 4 me. Serie vols. 1-3.

Société de Géographie. Bullétin 2 me. Série, Tomes 18-19. Paris, 1842-43.

Ditto ditto, Extract du Rapport Annuel, 1839.

Societé Physique et d'Histoire Naturelle de Gèneve Memoires, 1841-42, 1 vol.

Societé Royale d'agriculture de Lyon.

Annales des Sciences Physiques et Naturelles 1838-1840, 3 vols.

Societé Royale des antiquaries du Nord, section Asiatique, mémoires, 1842 43, Copenhagen.

Tassy, (G. de) Saadi Paris, 1845,-P.

Walkenaer, (Baron de) Notice Historique sur la vie et les ouvrages de Major Rennell,-P.

#### Italian.

Hemső, (G. de) Ultimi progressi de la Geografia. Milano 1843.—P. Informe Sobre el Estado de las Islas Filipinas an 1842 Madrid 1843,2 vols.

#### German.

Koenigliche Gesellschaft für die nordische Alterthumskunde. Iahresversammlung, 1842. Lassen, (Ch) Zeitschrift für die Kunde des Morgeplands. Sechsten Bandes erstes Heft, 1844. Leitfaden zur nordishen Alterthumskunde. Sopenhagen 1837.—P.

Danish.

Annaler for nordisk old kyndighed, 1840-41, vol. I. 1842, 1843.

Latin.

Lassen, (Chr) de Taprobane Insula, veteribus cognita, dissertatio. Bonae, 1842.—P.

Hindoostance.

Rafiel Hishab, 1 vol.

#### Zend.

Pramje Aspandiarjei; The Zaina of the Parsis with Guzarati translation, paraphrase, and comment, 1843.

### Sanscrit.

Yates, (W.) Nalayodaya by Kalidasa. Text and Translation. Calcutta, 1844, 1 vol.

Oriental Publications, &c. sold from the 1st of January 1844, to the 31st December, 1844.

								Ra. A	la. i	Ps.
Mahabharata, vol. I. 6 copies,	vol. II	. 6 do.,	Vol. III.	6 do., vo	I. IV. 7- de		***	260	0	0
Index to ditto, vol. I. 5 copies,	, vol. I	I. 5 do.,	vol. III.	5 do., vo	1. IV. 5 d	D	***	20	0	0
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8 do., vol. VI., 8 do		***	***	***		***		248	.0	0
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### ABSTRACT.

Account of the Oriental Publications delivered, sold, and in store, from 31st of July 1843, to December the 31st, 1844.

### Mahabharata.

				Vols.	I.	11.	III.	IV.
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# JAN. 1845.]

# Proceedings of the Asiatic Society.

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Dictio	Dictionarium Latino-Anamiticum.								
Found,		-	-	Copie	. 58				
Delivered and Sold,	NAME OF THE REST		***	11	11				
NO DE LA COMPANSION DE				C-N					
Balance,	***	2000	***	***	47				

The Catalogue accompanying this letter was ordered to be published in the Proceedings, and upon the proposal of the President, seconded by the Secretary, it was resolved, that a supplementary Catalogue, to comprise all the works received since the last Catalogue of the Library was printed, be also prepared and printed.

Read the following letter also from the Librarian :-

### To H. Torrens, Esq., Secretary, Asiatic Society.

SIR,-I beg leave to inform you, that I can procure the second volume of Strange's "Elements of Hindoo Law," and the first volume of Crawford's "Indian Archi-

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pelago at 8 and 5 rupees respectively. As the original price of Strange's Elements is 11 rupees per volume, and of Crawford's Indian Archipelago 8 rupees per volume, will you authorize me to purchase those volumes for the Library, in order to complete the above mentioned works.

I take this opportunity to submit to you the following list of valuable Oriental works, which I would suggest should be purchased for the Library:—

- 1. Die Zigeuner in Europa and Asien, von Dr. A. T. Pott. Erster Theil. Halle. 1844.
- Kammavakya, liber de officiis sacerdotum Buddhicorum. Police, Latine. Auct. Fr. Spiegel.
- 3. Chr. Lassen, Indische Alterthums-Kunde. Ersten Bandes erste Hälfte.
- 4. Panini's Acht Bücher grammatischer Regeln, von Otto Böthlinck. 2 Bände.
- 5. Radices Linguæ Pracriticæ. Ed. N. Delius.
- 6 Radices linguæ Sanscriticæ. Ed. N. L. Westergaard.
- 7. Böthlingk, (D.) Erster Versuch über den Accent im Sanscrit.
- 8. Die Declination im Sanscrit.
- 9. Unadi Affixe.
- 5 Upanishads aus dem Yayur, Samu and Atharba-Veda. Herausgegeben von L. Paley.

14th January, 1845.

E. ROER.

Resolved—That the Secretary and Librarian be authorized to purchase these works as occasion may present. The work of Count Bijonsterna, entitled Theogony, Cosmogony, and Philosophy of the Hindoos, was also specially ordered to be obtained for the use of the Archæological Committee.

The Secretary presented specimen copies of Abdool Ruzzak's work on Suffee terms, edited by Dr. Sprenger, of which those half bound were considered the best for the presentation copies.

The following note was read :-

MY DEAR SIR,—My friend Colonel Stacy of the 43rd Regt. having requested me to make over to the charge of the Curator of the Asiatic Society the accompanying ancient Hebrew MS., I have the pleasure to send it per bearer, and shall be favored by your acknowledging the receipt of it.

Ballygunge, 11th January, 1845.

ROB. WROUGHTON.

The MS. to which it refers was handed to the Rev. Dr. Hæberlin, for examination and report.

Read the following letter and paper from the Secretary to the Government of Bombay: —

### (No. 3656 of 1844.)

### To the Secretary to the Asiatic Society of Calcutta.

General Department.

Sig,-I am directed by the Honorable the Governor in Council of Bombay to request the acceptance by the Asiatic Society of Calcutta, of the accompanying six



gold coins, discovered in the village of Hecolee in the Malwan Talooka of the Rutnagherry Collectorate, and at the same time to forward a copy of a descriptive memorandum by the Secretary to the Bombay Branch of the Royal Asiatic Society.

Bombay Castle, 12th December, 1844.

M. ESCOMBE,

Secretary to Government.

Notice by the Secretary of the Society on ten Hindie gold coins, found at the village of Hewli in the Southern Konkan, and presented by Government; also on a collection of gold Zodiac coins of the Emperor Jehangir.

The ten gold coins transmitted by Government, for the acceptance of the Society, weigh each — grains, and have generally, on one side, the figure of a lion, with an inscription below on Telagu letters, Bāliji Shri, which may be translated prosperity to the Bali, and which are oblations of food offered, at the four cardinal points, to Indra, god of the firmament, Yama judge of the dead, Varuna the ocean, and Soma the moon.\* Two of the coins are hammered, and quite plain on one side; having on the other, stamped symbols for the four preceding deities, indicated by letters, among which I recognize the Telagu letter k standing for Yama, and the cave ch for Soma. The centre symbol must therefore be intended for Vivaswa, or the sun. On the reverse of six of the coins we find written within a circle the word Rudra, a name for Siva; and on another of them, the Trisul, or emblem of Siva, with an inscription below in Deva Nagari or Shrimanya Devaya Alticala to the prosperous god; this last is the newest of the series, and indicates the establishment of the Saivite worship.

In the McKenzie collection of Hindoo gold coins, two of them are enumerated as the Sinha Mudra Fanam, or the Fanam with the lion impression, without any further information being given regarding them. These, and the ones now under consideration, may, with much probability, be assigned to the successors of the Andhra kings of Telingana, the Narapati sovereigns of Warangal; who appear to have been originally feudatories of the Chalukya kings of Kalyani. This family is known by the name of the Kakataya princes of Warangal, who at the commencement of their career, in the end of the eleventh century of our era, were Jains. Their original residence was Anumakonda, from whence, sometime after Sal 1010, A. D. 1088, these princes removed to Warangal, which became their capital, and represented the chief Hindu state of Southern India, till destroyed by the Mahomedans during the reign of Ghias-ad-din Toghluk of Delhi, Hejirah 721, A. D. 1321. The then reigning Prince of Warangal is called, in Colonel Brigg's translation of Ferishta, Sudder Dew, being an evident mistake for his real name Rudra Deva; whose possessions appear to have been bounded on the North-west by those of Rama, Raja of Devagiri, the modern Daolatabad.

The coins now submitted for examination, having on the reverse the name of Rudra, may have been struck during the reign of the prince just mentioned; but there are good grounds for assigning them a higher antiquity, or the beginning of A. D. 1100, as at this time the second of the Kakataya princes of Warangal, named Rudra Deva, adopted the Saiva in place of the Jain faith, and built many temples to Siva or Ma-

<sup>\*</sup> See perpetual obligations of a householder in Wilson's translation of the Vishesu Purara, Quarto, p. 302.

hadeva, in order to expiate the crime of having killed his father. Only one decisively Saivite coin appears in this collection, and is the most recent of the series; all the others indicating the prevalence of the Jain practice of astrology, and the worship of the Bali or Baliah, which are sidereal spirits.

(Signed,) JAMES BIRD,
Secretary, Bombay Branch Royal Asiatic Society.
(True Copy,)

W. ESCOMBE.

Secretary to Government.

The Sub-Secretary stated, that he had received from Dr. Mouat the following letter, with the pamphlets therein alluded to. The pamphlets were ordered to be distributed to the Members of the Committee.

MY DEAR PIDDINGTON,—Mr. Latter, just before leaving for Arracan, requested to present the accompanying copies of his 'Note on Budhism' to the Asiatic Society, for the use of the Members of the Committee appointed to carry out the plans developed in the letter from the Honorable Court of Directors.

18th January.

FRED. J. MOUAT.

Read the following letters :-

(No. 3076.)

From the Under-Secretary to the Government of Bengal, to H. Torres, Esq. Vice President and Secretary to the Asiatic Society, dated Fort William, 11th December, 1844.

SIR,—With reference to your letter of the 7th March last, recommending on the part of the Asiatic Society, that certain books now in the Calcutta Public Library should be transferred to the charge of the Society, I am directed to forward, for the information of that body, the accompanying copy of a letter, dated the 4th ultimo, from the Curators of the Library.

At the same time, I am instructed to intimate that, though in the opinion of the Right Honorable the Governor, the existing arrangement cannot be fairly or properly disturbed without the consent of both Associations, yet His Excellency is inclined to think that, if the works in question are connected with Eastern Philology, they would be better placed in the Library of the Asiatic Society, than in the Public Library.

A. TURNBULL,

Under Secretary to the Government of Bengal.

From the Curators of the Calcutta Public Library, to A. Tornbull, Esq. Under Secretary to the Government of Bengal.

Sir.—I have the honor to acknowledge, on the part of the Curators, the receipt of your letter, dated 15th April last, enclosing copy of a letter from the Vice President and Secretary to the Asiatic Society, and requesting us to report, for the information of Government, our willingness or otherwise to accede to the proposition for the transfer of the books therein alluded to, from the Calcutta Public Library to that of the Asiatic Society.



We beg at the same time to apologize for the delay which, by some singular accident, has occurred. With regard to the proposition of a transfer of the books, we beg to state, for the information of the Hon'ble the Governor of Bengal, that the books became the property of the Members of the Calcutta Public Library by a gift of the Bengal Government, confirmed by the Hon'ble Court of Directors, under certain engagements, which it is unnecessary at present to enter into, but which have been always complied with. As books of reference, we beg to observe that they are far more available to the public here than they can possibly be at the Library of the Asiatic Society, from the number of our subscribers, and the popular form of our Institution generally.

Metcalfe Hall, 4th Nov. 1844. (Signed) G. T. Marshall, Curator, Chairman of the monthly meeting of Curators. (True copy,)

A. Turnbull,
Under Secretary to the Government of Bengal.

Resolved-That the following gentlemen, viz. :-

Dr. ROER,
Dr. GANTHONY,
S. G. T. HEATLEY, Esq.

and H. Torrens, Esq. as Secretary, be requested to form a Sub-Committee for considering what interchange might take place between the Society and the Public Library, as to duplicate works, without reference to subsequent arrangements.

Read the following letter addressed to the Geological Society of London, and it was agreed that it would be proper to despatch at the close of every year, one of the same tenor to every Society or Editor, whose works are regularly received by the Society.

The Secretary, Geological Society of London.

SIR,—I am directed to acknowledge the due and regular receipt of your Transactions and Proceedings by the Asiatic Society of Bengal, and to express to your Society our best thanks for the same. Should any irregularity in the receipt of the Journal or Transactions (Researches) of the Asiatic Society of Bengal occur, our London publishers and Agents, Messrs. Allen and Co., will readily explain or rectify it.

We have to request you will be good enough to transmit to them the numbers of your Proceedings, noted on the other side, and your bill for them, as the most part have probably been duly received by us, but are lost.

(Signed) H. Tornens,
V. P. and Sec. Asiatic Society of Bengal.

Museum, 20th Jan. 1845.

Read the following extract of a letter from Captain Phayre, B. N. I. to the Secretary, dated Sandoway, 2nd December 1844.

MY DEAR TORRENS,-I hope, before long, that I shall be able to offer a treatise on Burmese Astronomy, from the pen of the Rev. Mr. Stilson, a Missionary here,

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who is fully competent to the task. I am sorry the coins (the Persian part of them) are undecipherable; the fact is, the inscriptions must have been cut by some ignorant person in Arrakan, with a few Persian letters scrawled for the name of the thing. Are the gold coins (Elephant type) from Cheduba?

Sandoway, December 2, 1844.

The Secretary presented a paper from J. Middleton, Esq. C. S., being Observations on the specific Gravity of sea-water, which was referred to the Editors of the Journal for publication.

As it was already late, the President suggested that it might be advisable to call a supplementary Meeting for such businessess remained, and for the reports of the Curators; which was agreed to, and Saturday the 1st February being considered as he most convenient day, it was named for that purpose.

For all the foregoing communications and contributions, the best thanks of the Society were accorded.

### Proceedings of the Supplementary Meeting.

As above noted, the Supplementary Meeting of the Society was held on the 1st February, at 7½ r. m.—J. Fulton, Esq., Member Committee of Papers, in the Chair, when the reports of the Curators were read as follows:—

REPORT OF THE CURATOR, MUSEUM OF ECONOMIC GEOLOGY, AND GEOLOGICAL AND MINERALOGICAL DEPARTMENTS, FOR THE MONTH OF DECEMBER.

Geological and Mineralogical .- Our zealous and indefatigable contributor, Lieut. Sherwill of the Behar Revenue Survey, has sent us a most valuable geological map of Zillah Behar, with three chests containing upwards of 350 splendid sized specimens of the various rocks and minerals, numbered to the localities marked on the map. Lieut. Sherwill's notes to accompany the specimens have not yet arrived, but I have deemed it right to bring forward this magnificent contribution this evening, that we may have the pleasure of thanking him, as he so richly deserves, at the earliest possible moment. If the Society think with me, I should deem it right that it should, in such manner as may be thought proper, bring to the special notice of Government this meritorious instance of an officer voluntarily adding so highly and so valuably to his particular duties; of which we may, I think truly say, that there is no example yet on record. It must not be forgotten, that the officers of the Revenue Survey have no light task, and that this addition to our knowledge of his district has been made by Lieut. Sherwill probably in the hours of relaxation and repose. I trust that his notes, with what we can glean from Buchanan, will enable us to construct some good sections; in which case, imperfect as they may, and as every thing short of a regular geological survey, must be, it will still be the best geological notice of any separate Zillah in India, and an invaluable example to others; one indeed, which I feel assured the Society will not allow to pass by without all the honour in its power to bestow

I present now my detailed report on the Aerolite, presented by Captain J. Abbott, which was exhibited at the October meeting. I have put it in the form of a paper for



the Journal, as these phænomena are of special interest at home on many accounts, and our Aerolite is of a very rare kind.

I mentioned in my former report, that we had written to the Collector of Candeish, requesting his assistance in procuring further information of the Aerolite, and more specimens if obtainable. I have now the pleasure of submitting his reply, which is as follows. The report will be incorporated with my paper.

H. Torrens, Esq. Secretary and Vice-President, Asiatic Society.

Sir,—I have now the pleasure to comply as far as in my power lies, with the request contained in your letter of the 23rd November last, and to send you five pieces of the Aerolite to which you allude, with a statement from the parties who witnessed the fall of it.

If in this or any other matter I can be of service by furnishing information, or otherwise forwarding the views of your Society, I beg you will freely command me.

Candeish, June 6, 1845.

J. M. BELL,

Collector of Candeish.

P. S.—The fragments of the Aerolite have been sent by bangy post; I shall be glad to hear that you have received them, and that they are of sufficient size to be of value.

Captain Latter, 67th B. N. I. has presented us with a very beautiful collection of minerals, being 128 good sized specimens and from first-rate dealers, (Mawe or Tennant?) some of which will be handsome additions to our cabinet, and others serve to replace inferior specimens or to shew varieties. Captain Latter has added to this very hand-some donation a considerable number of Geological and Mineralogical specimens from Algeria; including some of copper, from the lodes now working on the flanks of the lesser Atlas by the French! and fossils, &c. from the desert between Suez and Cairo.

We should also place on record the following extract of a polite letter from Capt-Baker, B. E., to whom I have written to say that we should be most obliged by any thing from such a locality.

Secretary to the Asiatic Society of Calcutta.

DEAR SIR,

I passed through Calcutta lately on my return from Scinde, and had hoped to present to the Society some geological specimens from that country; unfortunately, however, my baggage had not arrived before I was obliged to leave, and it may even be sometime before I have an opportunity of sending them.

On the arrival of my baggage, you will however receive two small boxes of fossils from Lieut. Blagrave of the Sinde Survey.

28th December, 1844.

W. E. BAKER, Capt. Engineers.

Museum of Economic Geology.—A specimen was handed to me at the meeting of January, marked as "a species of Asphaltum from the bed of the Namsay river near Jeypore, Upper Assam, presented by Mr. F. C. Marshall." It is unfortunately not Asphaltum, which will be a great treasure wherever it is discovered in any accessible locality in India, but cannel coal, apparently of a very fine quality. Our thanks are nevertheless equally due to Mr. Marshall for his very kind attention, and we shall be greatly obliged by specimens of everything he can send us; particularly if pitch-like or

earthy-looking substances of any kind, which melt and burn, and if they also effervesce with any acids, as strong vinegar or lime-juice, so much the better.

I have here also again the pleasure of referring to Lieut. Sherwill's active kindness in support of the objects of the Museum. I had written to him on the subject of the Corundum recently found and presented by Dr. Rowe, and in reply he sends us a set of specimens analogous to those which I had obtained from the bazar, but accompanied by the following very interesting account of the specimens and mines; which last were not known, I think, to exist in any locality north of the Nerbudda.

MY DEAR SIR,—I have succeeded after some trouble in getting you specimens of Corundum, from a locale little known to Europeans; they were obtained from a hill in Lat. 24° 10′, Long. 83° 20′, about 20 miles S. W. from Vantaree, behind the table land of Rhotas, in a province known as Singrowlee. The mines are worked once a year, when enough is worked out to supply the wants of the Mahajuns, who send bullocks to convey it away. From this spot the greater part of Western India is supplied. The following Nos. apply to the Nos. on the specimens.

- No. 1. Goolabee, named from its rose colour, is considered the best.
- No. 2. Mussooreea, named from its colour, as resembling Mussoor-dal (ervum lens) is 2nd in quality.
  - No. 3. Bhakra, from being of many colours, (greyish ?) 3rd in quality.
- No. 4. Teleeya, named from its resembling in colour, the seed of the telee, 4th in quality.
  - No. 5. Considered impure, being mixed with scates of Mica-
  - No. 6. Very impure, being mixed with crystals of (Zeolite?\*)

In a short time I hope to be able to go to the spot myself, when you shall have a description of the place, rocks, &c. I think if you look amongst my Behar specimens you will find some corundum of the 1st or Goolabee quality, about No. 250 or 240.

Legend attached to the quarrying of the Singrowlee Mine.

"The rock, by the permission of the gods, is for one day, and one day only in the year, Corundum; during the remaining 364 days the rock is mere rock and of no earthly use." This is rather a clever story of the owner of the quarry! I should like very much to hear you do find any Corundum amongst my Behar specimens.

W. S. SHERWILL

We received some time ago from Captain Williams the following letter and notice, with the small fragments (of a few grains in weight only) referred to in it.

H. PIDDINGTON, Esq. Assistant Secretary to the Asiatic Society of Calcutta.

My DEAR Str.,—I have had the pleasure to receive your letter regarding the Volcano near this place, and I will not fail to collect specimens of the stones, earth, &c. &c., on, and all around the hill, and send them up in the "Amherst."

As you have kindly offered me your services, I take the liberty of sending you four bits of stones sent out to me by a brother by the last Overland, who obtained them from a private in H. M. 4th Dragoons. It (the stone) is celebrated for its virtues in cleaning bridle bits, &c. and my brother wishes me to collect a quantity for him; but what the stone is, or where to be had, I am unable to find out, and shall feel obliged by your informing me. It appears from the Dragoon's memorandum that the natives of India (for he got it in this country) make idols of it. I fear the Dragoon is an old



Soldier, and older traveller, and is imposing on my countrymen the untravelled Welsh. Please to return the stones.

Yours faithfully,

Kyook Phyoo, 14th July, 1844

D. WILLIAMS.

The following Memorandum accompanied Major Williams's letter:—

Direction for polishing Iron and Steel.

"Take about two drams of Samy stone, put in a mortar, powder it as fine as possible, then put it on a slabstone, or what painters do mix their paint on, then rub it down with sweet oil, (N. B.—The best of oil,) until it be as fine as milk, the finest the best. Then take a new piece of strong cloth or thick flannel, then soak it with the above mixture. Rub your irons with it; afterwards take fine shamois' leather with rotten stone or whitening and chalk, and it will show the highest polish ever known. The same rag will last six months without failing. Never attempt to put fresh stuff on the old rag, for the stuff will remain on the rag as long as it may last if taken care of. Keep it from wet and strong heat.

"Samy stone is found in several places in the East Indies, but the best we found is at Bombay, and most plentiful; we paid from 1-3 to 2-6 of English money per pound for it in India. The inhabitants makes idols of it of different figures, and paints it in red. There is none to be got in England, except what is in our troop; you can get some home if you know any person in India, or a sailor that trades to that country, as it may be sent or bought without duty, &c. There is several grooms in England that had some home after they had the receipt from us. For the above receipt I had five pounds, never gave it before under ten rupees; I have sent you two small pieces, and you can try one for experience, the other you may keep to prove what you may get again: my stock is getting very short at present, else I should send you more of it. Received 5 shillings.

Newcastle, March 28th, 1844.

H. HALL, 4th V. O. L. D."

As far as could be ascertained, from the small splinters I ventured to detach from the minute specimens sent, there is no doubt that the stone is a variety of Pagodite, which is almost all which can be pronounced of it now. I have carefully kept the remainder for comparison, and indeed have deferred reporting my examination of it, in the hope that some of the many persons to whom I have written would have been able to discover what this Samy stone—evidently Swamy (God) stone—is; but hitherto, I have heard of nothing approaching to it. The question nevertheless is of much interest, for the art of polishing metals is often one of high importance; and the use of an intermediate substance between the coarse polish of the Corundum or emery, brick or porcelain dust and the finishing effect of the rotten stone, as here described, is worth attention. The use of the common steatite in polishing, and as an anti-attrition ingredient has been long known; but the whole phænomena of polishing substances, and their effects on reflecting surfaces have yet been so little studied, that it is always proper that due weight be given to any fact which may lead to a useful practice.

The Secretary stated, that the suggestion of the Curator, respecting Lieut. Sherwill's labours, had been also mentioned at the regular Meeting, and fully approved of; it was resolved, a letter should be addressed to Government as proposed.



# JOURNAL

OF THE

# ASIATIC SOCIETY.

Translation of the Toofut ul Kiram, a History of Sindh. By Lieut. Postans.

Introduction.

The following translation of the most succinct, consistent, and continued history of Sindh, which I have yet met with, has been made under the idea that, intimately connected as we have become with that country, its history cannot be otherwise than highly interesting, and that there are many who may desire information on the subject. The author of the "Toofut ul Kiram," has in his 3rd vol. collected materials from the best authorities; I have only omitted legends and stories, which have been given elsewhere, (Bengal Asiatic Society's Journal,) as also the histories of holy Seers, Sheikhs, and Seyuds, they being alone interesting to the followers of the prophet; for the rest I believe it to be nearly a literal rendering of the text into English, with a few explanatory notes. I regret, that want of time, and emergent public duty, will not allow me to do more at present.

It will be seen that, with the exception of a very short period prior to the Mahomedan conquest by Bin Cassim, in the first century of the Hejira, we have no account of the country under its Hindoo rulers; and I regret to say, that all efforts to procure any information on the subject have hitherto proved unavailing. Had the Mahomedan historians sought for materials, they might doubtless have been found, and thus the hiatus between the expedition of Alexander, and that of the Khalif Walid, might have been filled up, so as to throw some light upon a portion of the coun-

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try, rendered memorable by the great conqueror's passage down the Indus. As it is, we have a blank of nearly eleven centuries; and we only know, from the description herewith given of the extent of country tributary to the Sindh Rajahs or Rahis, that they were powerful princes, and that the kingdom of Sindh possessed in their time a degree of importance which declined after its subjugation by the Moslems, when it became dismembered, and fell a constant prey to succeeding conquerors.

From the period of the Mahomedans entering Sindh to the accession of the present family of Talpúr chiefs, the chronological order of its various rulers may be thus briefly given, and the number of dynasties during a period of about 1200 years, affords a curious instance of eastern revolutions. From Bin Cassim downwards, Sindh has fallen to the arms of the greatest conquerors of the East.

### Taken by the Khalif Walid.

Beni Oomhae,			H.	93
Falls to the Abbasides,		***	111	133
Subdued by Mahomed of Gh	uzni,	•••	111	416
Tribe of Sumrahs usurped th	e authority	,	,,,	446
Invaded by Jengiz Khan,	• 10 B••• 1	***	111	610
Tributary to Delhi,			"	694
18 Jams of the tribe of Súma	h,		,,,	752
Conquered by Shah Beg Argl	nún,		"	927
Divided between the Arghúns	and Tirkh	ans,	1)	950
Conquered by Akhbar under	the Khan I	Cha-		
nam, and ceases to be inde	pendent,	•••	"	999
Invasion of Nadir Shah, and	annexation	i to		
Persia,		***	11	1149
Kalora Chiefs rule in Sind	h, tributar	y to		
Cabul,	a militaria s	10000	,	1166
Kaloras overthrown by the T	alpurs,		A. D.	1779
Talpurs cease to be tributary	to Cabul,	***	n	1839*

The downfall of the Kaloras during the time of Sir Afraz Khan (where the manuscript ends,) and the rise of the present Talpur family, have been so fully given elsewhere, that I do not annex the account to this transla-

To this list we may now add, "Conquered by Sir C. Napier, and annexed to British India, by Lord Ellenborough,—A. D. 1843."—Eps.



tion. Of the languages of the country the Sindee has been described by Mr. Wathen, and an excellent grammar, written by that gentleman, published by Government. The Persian language is used by the higher classes, and is that in which all the State correspondence and revenue accounts are kept; most of the Hindoos of Upper Sindh speak it fluently, the result of their intercourse with the natives of Affghanistan. A slight knowledge of it will be found of very considerable service to individuals stationed in the country.

As connected with this translation, I would beg to refer all those desirous of obtaining information on the inhabitants, cities (ancient and modern), and divisions of the country of Sindh, to the admirable papers published in the Transactions of the Royal Geographical Society, and written by the late Capt. Jas. McMurdo, "An account of the country of Sindh, with remarks on the state of society, manners, and customs of the people, &c."

J. Postans,

Shikarpore, 5th July, 1841.

Assistant Political Agent.

Sindh is one of the sixty-one divisions of the world, situated in the four first climates, belonging chiefly to the second, and is in the same region as the holy cities of Mecca and Medina; the river of Sindh rises in the mountains of Cashmere, another joins it from the mountains of Cabul, in Multan it is met by the river Sibine, and there proceeds to the sea. Its water is very clear and cool: in the language of the country it is called Hichrand; all the rivers of Sindh flow towards the south, where they empty themselves into the sea, such as the waters of Pitab, Chinab, Sehae, Suttanpur and Bajawareah. The climate of Sindh is delightful, its morning and evening cool: the country to the north, hotter than that to the south; its inhabitants intelligent, and of large stature.

Let it not be concealed, that whilst the people of Sindh were formerly Authors of Sindh ignorant of the Persian and Arabic languages, no account as a compilation existed of those countries; but in the year 613 H., Alli Bin Ahmid, Bin Alli Bukur Kufi, an inhabitant of Ooch, wandered to this valley, and arrived at the cities of Bukur and Alor, where he saw the families of the great men and descen-

\* See Dr. and Sir A. Burnes, and Sir H. Pottinger.

<sup>†</sup> A vocabulary by Capt. Eastwick, and a grammar and vocabulary of the Brahooi and Beloochi languages, by Major Leech, have also been published in our Journal.— Eps.

dants of the Arabs, and searched for accounts of the conquest of the Moslems in all its particulars; he also became acquainted with Cazi Ismail, Bin Alli, Bin Mamomed, Bin Moussa, Bin Jahir, and saw in the possession of that great man a description in Arabic, written by his ancestors, of the conquest of Sindh: this he translated into Persian. After him, Meer Masoom Bukeri, and after him Meer Mahomed

The work known as the Chach Nameh, which brings the history of Sindh down to about 16 A.D., was written by Meer Migawar. Jahir Massiani, in the times of Akbar and Jihangir, composed works, and also the "Urghim Nameh," "Jukhar Nameh," and "Byler Nameh" were compiled. Subsequent to these no clear account existed (or no one was acquainted with affairs) up to my own time; by abbreviating and selecting

from various books, and by recording some new events, I trust it will be found acceptable to all men.

Let it be understood, that according to what has been previously mentioned, the province of Sindh was so called from "Sindh" (the brother of Hindh, the son of Hoh) whose descendants from generation to generation governed in that country, and tribes without number came forth and ruled, whose accounts are not recorded. From amongst these the tribe of Nubuja, the men of Jak, and the tribe of Momid ruled in their turn: of these there are no detailed accounts, so that they pass on to the last of the Rahis; and after that they relate the histories of other classes.

The dynasty of the Rahis had their capital at Alor, and the Dynasty of the boundaries of their dominions and possessions were Rahis. to the eastward as far as Cashmir and Kimùj, westward to Mihran and the shore of the sea of Oman, i. e. at the Boundaries of their port of Derjul, to the south to the confines of the empire. port of Surat, and to the north to Candahar, and Seistan, with the hills of Sulliman, Kirwan and Kaijkanan.

1. Rahi Diwahij, a distinguished prince; his sway extended over the boundaries described, and was absolute. The princes of Hind were in treaties of friendship with him, and in all his territories the merchant (Caravans) travelled in safety.

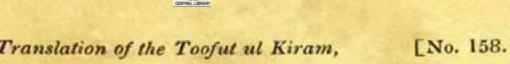
<sup>\*</sup> The ruins of Alor are still to be seen about four miles from Roree; opinions differ as to the river having at any period flowed in that direction, as stated in the "Tooputal Kisum." I cannot learn that there are any traces of Hindoo architecture to be found at Alor.



- When he died, his son Sahiras was exalted to the crown, and in the steps of his father he for a long period enjoyed ease and prosperity: after his death, his son,
- 3. Rahi Sahasi, succeeded happily to the high seat of empire and the throne of Dominion; he conducted his affairs prosperously, and successfully followed out the institutions of his predecessors: after him, his son,
- 4. Rahi Sahiras the 2nd, took his place. The king (of) Nimraz brought a force against him; on learning this intelligence, he met him in the country of Kich and prepared for battle; from morning until noon they were occupied in conflict, but by chance Sabiras was wounded by an arrow in the neck and died. The king Nimraz despoiled his camp and returned. The army of Sahiraz agreed together, and placed his son Sahasi upon the throne.
- 5. Rahi Sahasi the 2nd, excelled his ancestors in endowments and good qualities; in a short period he consolidated and settled his dominions as far as their boundaries extended, and remained at his ease in his capital. He ordained for his subjects in lieu of tax, that they should fill up with earth (repair) six forts, viz. Ooch, Matilah, Siwari, Mud, Alor, and Seewistan.

They say he had a porter named Ram, and a minister named Boidhiman: one day a brahmin named Chach, son Introduction of the Brahof Silabig, distinguished amongst his class, min Chach to the Rahi. came to Ram, and they became acquainted; the porter was well pleased with him, and took him to the minister, after some time, and when Chach was intimate with the minister, it so happened, that the latter became sick, and the Rahi's order arrived, to call the agents of the provinces together: now since he (the minister) saw that Chach was acute and intelligent, he sent him from himself to the Rahi, who was in the inner apartment of the palace. His wife Rani Sohindi wished to draw the veil, but the Rahi said what necessity can there be for a veil before brahmins; and when the brahmin Chach entered, Sahisi became delighted with his eloquence, and dictated his replies to him; so in time, when the ability of the brahmin became apparent to the Rahi, he directed that in future the curtain should be dispensed with in his favor, and that the necessary affairs of State should be transacted in the inner department of the palace; at this juncture the





Rani became enamoured of Chach to distraction; but notwithstanding she sent messages, Chach would not consent The Rani becomes enamoured of Chach. to her views, until his affairs prospered, and he had laid all classes under obligations for his favours and wisdom. By the chance of fortune's favours the Rahi Sahasi was attacked The Rani called Chach, and said, "The Rahi with a mortal illness. has no children or descendants, certainly his relations will become heirs to the country, and it will not remain with you and me; I will therefore devise some scheme, in order that the throne may be secured to you:" to this he agreed. The Rani Succession secured to sent messages in various directions to the intent, that the Rahi Sahasi had becomeconvalescent, but had not strength to conduct his own affairs, (to rise up); "some time has elapsed, and the affairs of the country were in confusion, now he has directed and given his signet to Chach, who is to sit in his place on the throne, and who will demand from you the particulars and accounts of the important business of the State, wherefore by all means let all of you be present:" all the rulers and great men, in obedience to the summons, presented themselves, and made their obeisance and bowed the knee to Chach. A short time after the Rahi died; the Rani's first care was to conceal his death, and having separately called those of the relations of Sahasi to the palace, who had claims (on the succession,) under the pretence of explaining the late Rahi's will, she imprisoned (chained) them; then calling their poorer connections, she said-"I have arrested these claimants to the throne on your account, each of you having his enemy here should precede the assembly and kill him, and having taken possession of his property and riches, let him become obedient to Chach; thus will be attain all his wishes." Thinking this the height of good fortune, these people did as they were directed: the period occupied by the rule of the five preceding Rajahs is 137 eyears, and then it descended to the Brahmins.

1st .- Brahmin Chach Bin Silabij. When Chach after the manner Accession of the described became sole heir to the throne, as ad-Brahmin Chach. vised by the Rani, he opened the doors of his treasury and bestowed largely upon high and low; at length the Rani having accomplished her ends, called together the nobles, head brahmins and great men, &c.

4

years.

directed them to make her lawful (as a wife) with Chach, and they were married, (connected in that knot) accordingly.

The Rana Mihrut Chitoori, who was a relation of Sahasi, having heard this, collected and brought a countless The Rana of Chittore disputes the throne with. army by stratagem, and wrote to Chach Chach. saying, "What have brahmins to do with rule or government; give me the authority, and you shall be reinstated in your former appointment."

Chach went himself to the Rani and said, "A powerful enemy has come forth-what do you advise?" the Rani said, "War is understood by men, (but) if you will change places and apparel with me, I will go forth and do battle with the enemy;" Chach was afflicted and distressed. The Rani, encouraging him, said, "You have treasure, quickly propitiate the soldiers, so that you be victorious." Chach immediately acted on this advice, and bestowed much wealth (on his army)-he thus was prepared. Rana Mihrut arrived in the neighbour-Rana of Chittore's hood of Alor; when the two armies met, Rana Mihrut armies near Alor. came forward, and said to Chach, "We are alone concerned in this quarrel, why should a multitude be needlessly destroyed; advance and let us make trial of our strength:" to this Chach replied, "I am a Brahmin, and cannot fight on horseback; descend, and I will combat with you." Rana Mihrut alighted from his horse, and Chach directed his groom to bring his horse slowly after him. Rana Mihrut being off his guard from this excuse of Chach, left his horse behind: they met-Chach Chach kills the sprang swiftly on his horse, and with one blow killed Rana and returns his adversary. The Rana's forces returned disvictorious. pirited and discomfited, whilst the victorious Chach returned to Alor. These affairs occurred about the first year of the Hijera. In short, after the victory over Rana Mihrut, Chach took counsel with the minister Budhiman, and appointed his own brother Naib of Alor for the settlement of the dependencies thereof. One named Muttah was sent to govern Sewistan, and Governors to countries appointed by Akham Lohana, governor of Brahmanabad, and Chach. Basar Bin Kakah having subdued some of the holders of the forts in Sewistan (or Sibi,) as also some tribes of Sewis (the capital of their country being Kaka Raj,) and Chach Death of Chach, after reigning 40 after having passed 40 years prosperously died, his

chundur Bin Sithe governor of Sewistan, went to the Rahi of Kunnuj,
reporting Chach's death, and saying, "His brother is
now lieutenant of the empire, if you attempt it the possession of the
country will be an easy affair." The Rahi sent his brother named
Basahis to Muttah; and Chundur immediately on hearing this prepared to oppose his enemy, and pursued Muttah and Basahis through
various portions of his dominions up to the vicinity of Alor; they tried
various schemes, but at last failed. In short, he (Chundur) ruled prosperously, until the 8th year, when he died. After him, his nephew,

2nd.—Dahir Bin Chach, adorned the throne; his brother Dihir Sin Dahir, son of Chach, he sent to Brahminabad as governor. One day he inquired of the astrologers as to his fate; they told him there was no bad omen in it, "but with whomsoever your sister marries he will succeed to Alor, and rule the country." Through fear of losing the country, Dahir contrived and married his own sister. His brother Dihir Sin was vexed at this intelligence, and prepared a force,

Dihir Sin, his brother, rebels against him: his death. Dahir caused him to be burnt, and proceeded to Brahmanabad, where he married his wife (brother's) the daughter of Akham Lohana, and remained there one year; and having appointed the son of Dihir Sin, named Chach governor of Brahmanabad: he returned to Alor, where he repaired the fort, which had only been half completed by his father, and arranged that four months of the cold weather should be passed in Brahmanabad, and four months of spring at Alor. In this way he occupied himself for eight years, and by degrees the affairs of the State were settled satisfactorily.

In short, having fixed the boundaries of his dominions to the east, he planted two cypress trees as a mark on the confines of Cashmere, and returned.

Accounts of the joining (assembling) of the Allofi Arabs.

The learned in such matters relate, that during the time of the Khalifat of Abodal Malk Bin Mirwa, when Hijjaj was governor of the Iraks, and his designs were directed towards Sindh and Hind, he sent a Seyud to Mikran, who killed Siffooi Bin Lam Himami; Abdullah Bin Abdul Rihem, and Mah Bin Mohawyah called together the

Arabs of Beni Asamah, and represented, that "the Sigoi, who was one of our tribe and people, has been killed unjustly; we must assemble and revenge him."

In short, they acted on this suggestion, and killed the Seyud and took possession of Mikram; after some time they fled through fear to Kharassan: Mujdhameh Bin Seyud came to Kirman to conquer Kharassan, and sent forward Abdyl Ruhman, Bin Ashahas. Allifis laid wait for him, and killed him; they fled to Sindh and came

to Dahir who, thinking them well adapted for the The Allafi tribe of police and protection of his country, took them Arabs are taken into the service of Dahir. into his own service. The above mentioned Allasis

were in Sindh until the coming of Bin Cassim, and the conquest of that country, when having procured a promise of pardon, they joined Bin Cassim. At length the princes of Hind having learnt the absolute dominion of Dahir, agreed together that previous to his attempting

The princes of Hind jealous of Dahir's power.

their conquest, they should take an army and conquer his country, and according to the agreement of the Rahis, Rahi Ra Mal, governor of

Kunnuj collected a large force, and advanced upon Dahir and surrounded Alor; Dabir was afflicted by his enemy, and asked advice of the minister Budhiman, who said, "The Arabs are expert in battle, entrust the affair to them." Dahir came to Mahamed Allafi, and sought

his friendship (assistance); the latter said, "Be satis-

The Allafi chief fied, bring not your forces, and direct that a deep of Kunnuj by astrata-ditch be dug to the length of a fursakh; cover it over gem. with grass, and leave it; after that, do as I direct."

When Dahir had thus done, Mahamed Allafi, with 500 Arabs and Sindees, picked men, made a night attack on the troops of Ran Mal: these being taken by surprise and awaking confused, fell on each other and destroyed themselves, and the illustrious Mahamed Allafi gave the signal for flight; the enemy, when they learnt that so small a force had attacked them, pursued and fell into the ditch; now Dahir himself with his force came out and took 80,000 men prisoners, and 50 war elephants: according to the directions of Budhiman the minister, he set them all free. Budhiman's wisdom was proved, and Dahir lavished his favors on him, and according to his entreaty, directed his name to be struck on one side of the copper coins.

From this vectory Dahir's position became strengthened, but the surrounding provinces and states were dissatisfied, and nourished more rebellion and sedition. He conducted the affairs of his country prosperously for 25 years, when his punishment was the loss of his kingdom, as will be related with other circumstances.

# Account of the capture of the Slave Girls of Sirundip.

They relate, that the country of Sirundip\* is of the ruby islands; from this had been sent some Abyssinian slaves with many valuable jewels and curiosities for the Khalif and Hijjaj, in the care of confidential servants in eight boats; by chance these were driven by a storm to the port of Diwalt, in the sea of Oman; robbers belonging to that place, of the tribe of Nikamrah, seized these people, and the representations of the agents of the king of Sirundip, that they were presents to the Reason of the first Mohamedan Khalif, had no effect. They said, "If invasion of Sindh your story is true, pay a ransom and procure release." In that assemblage were certain women in the purity of Islamism, who had intended making the Haj, and seeing the capital of the Kalifs; and Hijjaj, one of these, cried out thrice, "Oh Hijjaj! hear our complaints."

This intelligence was conveyed to Hijjaj; when he heard that the women had complained thrice in his name, he replied, three times, "I attend," and prepared to remedy the affair.

# Account of the death of Bazil.

When Hijjaj Bin Yusaf prepared to release the Moslem captives, he

Bazil, the first Mabomedan leader, sent threats to Dahir; the Khalif, and sent a messenger with
threats to Dahir; the Khalif was unconcerned in the
against Sindh.

matter, and Dahir said, "I am ignorant of the affair,
these robbers do not acknowledge my authority, they may have done
so or not; but you must judge." On the receipt of this answer, Hijjaj
again represented to the Khalif, and obtained the required permission.

<sup>\*</sup> Ceylon, thus proving a traffic between that place and Damascus.

<sup>+</sup> Is called from the Diwala, a temple for which it was famed. See Capt. McMurdo, Transactions of Rl. Geog. Society.



He appointed Abdul Allah Sullimah to Mikran, and adered Bazil that when he arrived at Mikran, he should collect 3,000 men and advance on Sindh. Bazil arrived at the Fort of Neirun, and threatened Diwal; Dahir having learnt this, sent his son Jaisisih with a large force to Diwal; from noon to night they contended. Bazil, after the utmost resistance, was killed, and many Moslems were captured. They say the governor of the Fort of Neirun\*, who was named Battle at Diwal, Samani, became terrified, and said to himself, "I and death of Bazil. guard the pass of the Arab forces into this country, they (the Sindees) have thus opened the road of revenge to the Arabs, it may not be that I should be crushed between the parties (hereafter):" accordingly he sent a confidential agent to Hijjaj and proffered his obedience, and obtained pardon. Amur Bin Abdullah said to Hijjaj, "Commit this momentous business to me, and I will proceed to Sindh and Hind;" but he was refused. Hijjaj said, "I have consulted the astrologers, and they report that Sindh and Hind will fall to the hand of Mahomed Bin Cassim. short, the period has now arrived for the setting of Bin Cassim pre-

Bin Cassim preferred to the command the star of the unbelievers, and the ascendency of the Sindh Army. of the religion of the prophet in those countries; this affair is more important than former undertakings, and must be intrusted to Bin Cassim." It shall soon be related from first to last.

Here I proceed to relate the extraordinary birth connected with the Story of Jaisisih, name of Jaisisih. They say the Rahi Dahir was one of Dahir. one day hunting, suddenly a tiger sprung from the jungle, Dahir stopped those who were running away, and himself prepared to attack the beast. His wife at this time had been pregnant ten months with Jaisisih, and being very fond of Dahir, and learning this she cried out and swooned; at length Dahir killed the tiger and returned unburt, but he found his wife dead: seeing the child moving in her womb, he ordered her to be opened, and they brought out the child; and this name, which signifies "the hunter of tigers," was given to him, and indeed when he became of years he was renowned for his courage and intrepidity.

<sup>\*</sup> Neiremkote, site of the present capital Hyderabad; this latter was founded by Gholam Shah Kallnah.



Accounts of the prangement and arrival of the Moslem army for the conquest of Sindh.

Arrangement and true believers, Umur Bin Khotah, (God's approval arrival of the Mahomedan army for the conquest of Sindh.

dan army for the conquest of Sindh.

dan army for the conquest of Sindh.

some vessels properly equipped under Mughirah Bin Abul Has to Diwal; at that time the brother of Chach, named Samami Bin Salabij, was governor of the place; he opposed the Mahomedans, and after a great deal of slaughter Múghirah Bin Abúl Has was killed, with many others, also many prisoners were taken. Abu Mússa Ashghuri, who ruled in

Various governors of Mikran attempt to subdue Sindh and fail.

Mikran, reported this circumstance to the Khalif, and wished to apply some remedy, but was prohibited from collecting troops; again at the time of the Khalifail.

Hassan (may God's approval be towards him) Abdullah Bin Amir, Bin Rubiahy became governor of Mikran, it was ordered that a confidential agent should be sent to Sindh, to spy into and discover the state of affairs. He sent Hakim Bin Hulliyah with directions to make himself well informed of every thing and report thereon; the Hakim said, that the water was black, the fruits were sour and poisonous, the ground stony, and the earth saline. The Khalif asked, what he thought of the inhabitants; he replied, "They were faithless." Thus the preparation of a force from that quarter (Mikram) was abandoned. Then in the Khalifat of the chief of the true believers, Alli, a force passed from Mikram, and victorious and successful arrived at the hill of Kag-Kaman, which is one of the boundaries of Sindh, 20,000 hill men opposed theirs; the Moslem army calling on the Most High, began the attack, the noise of the shouts terrified the enemy, who cried for quarter, whilst others fled. From that time on occasions of conflict, the Moslem noise of calling on the Most High is heard in those hills. The news of the death of the Khalif arrived, and any further advance was stopped. The force above mentioned returned to Mikram. When Mohawiyah obtained sovereignty, he appointed Abdullah Bin Sawad with 4,000 men Mohawiyah prepares for Sindh; by chance they arrived at the hill of a force for Sindh. Kag-Kaman, and were defeated by a large force of the unbelievers,



and at length returned and arrived at Mikram; at that juncture, Zyad was governor of the Iraks on the part of Mohawiyah, who wrote to him to send Rashid Bin Oomur to Sindh, and he took possession of the hill of Pageh, taking also the whole of the property found there.

Thus he also possessed himself of Kag-Kaman: he arrived at the hills of Mamzur and Bihung; the hill men, to the number of 50,000, assembled, and took possession of the passes; from morning to evening they fought desperately, Rashid was killed, and the Moslems defeated. The repairing of this affair was deputed to Rashid Bin Salim, he defeated the men of Kag-Kaman, and arrived in the territories of Budyha, where he was killed. Then Munzir Bin Harut, Bin Bashar, became governor of these provinces. He fell sick at Purabi, and died: at this time also Mohawiyah died, and Mirwan succeeded him; in his time no one was deputed to his enterprise until the time of Abdul Malk; he gave the governorship of the Iraks to Hijjaj, who sent the Seyud to Mikram; he, it so happened, was killed by the Alleifis as has been before related, whereupon Hijjaj sent Mujjah to Kirman, to take revenge upon the Allasis of Sindh; he died there in the distractions of these times. Abdul Malk the Khalif died, and Walid succeeded him, sending Mahomed Bin Haris to Mikram to settle the affairs of Hind and the Allasis; he killed one of the Allasis, and in the space of five months settled the country of Mikram satisfactorily, and took possession of various districts. After that the circumstances of the death of Bazil occurred as related, which increased the desire of revenge in Hijjaj, and it was settled to send Bin Cassim Sukifi, as will be related.

Relation of the arrival of Bin Cassim in Sindh, and account of the victories which he there achieved.

After the circumstance of the death of Bazil Hijjaj Bin Yasaf, it was represented to the Khalif that in Sindh insolence had obtained such ascendency, and punishment was so loudly called for, that he must issue his order for remedying these things, as also for the release of the Moslem prisoners, and taking revenge for the rebellion of those unbelievers, so that the country might be conquered. The Khalif replied, "The country is distant and unproductive, the expence of collecting forces will be ruinous, and only accomplished by oppression; it is better

to abandon the project, and pass it by." Hijjaj continually represented, that by the permission of the Most High, and the protection of the religion of the prophet, the infidels would soon be subdued, and the prisoners of the faithful who, for so long a period had been confined there, would be released, whilst the outlay for collecting an army should be paid over and doubled by those who were its causes. The Khalif being without option issued the order, and in the 92nd year of

The Khalif issues the order for the subjugation of Sindh in the 92nd year H.

the Hijera, Mahamed Bin Cassim, Bin Akib Sukfi, cousin and son-in-law of Hijjaj Yasaf, and 17 years old, made exertions, and they collected and sent with him 6,000 men from Sham and Irak.

They arrived at Shiraz, where they made the necessary preparations. Hijjaj then sent five battering rams with the equipment for breaching forts, in boats, in the care of Mugheriah and Khizam, with a select party. Thus they arrived at the port of Diwal, where they afterwards joined him (Bin Cassim). In short, Bin Cassim with all his previous and present forces, mustered 6,000 horse and 6,000 camels (of the class known as "Bukhti)" to carry his baggage, and set out for Mikran, and Mahamed Harun, notwithstanding the infirmity of his health, accompanied him; when they arrived at Mapilah, Harun by the decree of the Almighty died, and was buried there. They relate, that at that time Jaisish the son of Dahir, was in the fort of Neirun, and wrote to his father the intelligence of the arrival of Bin Cassim: he consulted the Allasis; they said, "The cousin of Hijjaj is coming with a large army, do not oppose him." Bin Cassim subdued Arman Bilah, and proceeded towards Diwal; in the mean time Mugheriah and Khizan with their party had arrived at Diwal, where they joined him. Bin Cassim threw a ditch round Diwal and encamped; he wrote Bin Cassim invests intelligence of his arrival to Hijjaj. They say, that Diwal. the news reached Hijjaj in seven days, for such was the swiftness of the messengers, that the intelligence of seven days' date, from and to, was daily received by each party. It is said, that in the fort of Diwal was a temple (place of idols) 40 guz in height, and in it a dome 40 guz high,

The temple at Diwal man for the protection of the country.

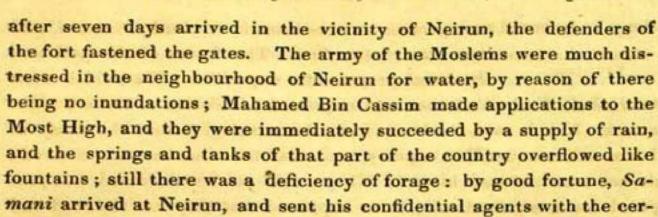
and on the top of the dome a silken flag with four is considered as a talis- ends. The infidels in fear and dismay made no preparation to fight: after some days a brahmin came out from the fort and asked for safety; he presented



1845.] bimself to Bin Cassim, and said, "I learn from my books that this country will be conquered by the Moslems, and the time has arrived, and you are the man. I am come to shew you the way: those before our times have constructed this temple as a talisman; until it is broken your road will not be opened; order some stratagem, so that the banner on the dome may be thrown down." Mahamed Bin Cassim bethought him how he should accomplish this; the engineer with the Catapulta said, "If you give me 10,000 dirhems I will agree by some means or another to bring down the banner and dome in three blows, if not I Mahamed Bin Cassim having obtained will have my hand cut off." permission from Hijjaj, ordered the Catapulta to be Dome of the temused, and by the help and power of the Almighty, ple thrown down. in three blows the work was accomplished, when the army of Islam getting into ranks and order attacked the fort, and the infidels being confounded were powerless and begged for quarter. Mahamed Cassim directed, that none should be given, but to deliver up the place. The Capture of Diwal governor threw himself from the breastwork, and fled, and the people of the fort being helpless and massacre of the opened the gates: for three days there was a massacre; they then brought out the Moslem prisoners, and captured immense treasures and property; they destroyed the temple of idols, which was called Diwal after the place, and built a musjid. A man named Kihilah, one of the infidels, was the keeper of the Moslem prisoners; when these were brought out it was discovered that he had exerted himself greatly in their behalf, and was overjoyed at their release as well as the victory of the army of Islam: Mahamed Cassim called him and pressed him to embrace the true faith, and he became a Moslem. After many honours and favours, he shared with Ahmed Bin Darah Nijdi the governorship of that place. At length, having satisfactorily arranged the affairs of that quarter, and placed his battering rams in boats, he started them by the river Sakurah to Neirun, and he himself proceeded by land in the same direction. They say that the Bin Cassim proceeds son of Dahir, Jaisisih, was formerly at Neirun, but

after hearing of the victory at Diwal, Dahir called him to Brahamanabad, and Samani the former governor of Neirun, who had procured a certificate of pardon from Hijjaj, as before mentioned in the account of the death of Bazil, was with Dahir. Now when Mahamed Cassim

1



The governor yields up the fort of Nei- the slave to be obedient, the reason of this omistion is, that during my absence the people in the fort have closed the gates; I wish if you will pardon the fault and warrant my safety to come and kiss your feet." Bin Cassim having paid due attention to those who had been sent, ordered "That it was necessary to punish those who had guarded the gates, but since you have interceded, come have an interview, and open the gates." Samani having done so, took the keys with suitable presents, and made his obeisance; he was favored, and provided every thing that was required. At length the army of Islam entered the fort; they destroyed the temples, and built musjids and minarets in their stead,

Governor appointed. Mouzzins and Imams were appointed, and Shunheh was made governor of the place. Taking Samani with him, Bin Cassim advanced; when they had proceeded some distance from Neirun at the place called Mauj, Samani sent a letter to Bicharah, son of Chundur, governor of Sewistan, thus: "We are not the men to bear force; this Arab army is all powerful; there is no use in opposing them;

Governor of Sewis- it is necessary to look after the interests of yourself tan refuses to submit and people, come and proffer your obedience, the word of Bin Cassim is powerful, undoubtedly this is the best policy." Bicharah refused to accede to submission, but prepared for battle. Thence the Moslem troops having advanced, reached the fort of Sewistan; one week was occupied in laying siege and attack; until at length Bicharah becoming dispirited, fled and went to Búdyah; Bin Kakah, Bin Kotah, who was governor of the castle of Sim Mahamed Cassim entered the fort of Sewistan\*, and took posses-

<sup>·</sup> Sewistan always means the modern Schwan.



sion; he favoured such persons as were brought to him by Samani, and Bin Cassim enters then started for Sim. The forces of Budyah and Bicharah prepared for opposition. The infidels went to Kakah, Budyah's father, and requested permission to make a night attack. Kakah said, "I know from the astrologers that the army of Islam will conquer this country, and that the time has now arrived; do not entertain such ideas." They would not be restrained, but prepared for a night attack; it so happened that they lost the road and dispersed into four parties, and although they wandered all night, they found themselves in the morning near the gate of the fort of Sim. Being afflicted they became penitent, and went to Kakah Chanah and stated their case. He said, "Do not think me less valiant than yourselves, but I know for certain that there is no use in contending with these men." In short, Kakah went himself and proffered his obedience; he was received with favour, and obtained safety for his followers. Mahamed Bin Cassim sent with him Abad al Mulk Bin Kies Aldaki, and ordered them to bring all who would be obedient (to his sway,) and to punish all who resisted. The Almighty gave them daily victories over the infidels, and at last these being frustrated, fled Gain fresh victories, the infidels proffer to the forts of Bultur Saluj and Kandail, when obedience. they solicited promises of safety and pardon, and, agreeing to pay tribute, departed to their own country: at this time an

agreeing to pay tribute, departed to their own country: at this time an Hijjaj sends order order arrived from Hijjaj, that Mahamed Bin Cassim to Bin Cassim to subdue Dahir. should return to Neirun to prepare to cope with Dahir, and cross the river Mihran.

The tribe of Chanah become obedient. clan, collected from various places, and sent a perbecome obedient. son to bring intelligence (of the Moslems); he arrived when the forces of the Arabs were arranged behind, Bin Cassim
engaged in prayer, and in their devotions obeying the postures of the
Moollah, he reported to his tribe, that those who could by thousands
be made to obey one man, it would be futile to oppose. Thus they
determined to declare allegiance to the Moslems, and after sending
suitable presents they arrived when Bin Cassim was at table, who
said "This tribe is fortunate," and they were ever after styled the tribe
of 'Chanah Mirzook,' or 'fortunate;' they then proffered their obedience and assistance of tribute, which was accepted, and they departed,

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and it was decreed that the land on that side of the river in the possession of the tribe of Chanah, should be taxed at a tenth, the same as that at Neirunkót, where the people had voluntarily tendered their obedience. In short, pursuant to the orders of Hijjaj, Bin Cassim returned, and having crossed the Mihran, arrived at the fort of Rawur

Governor of Rawur and Jeyur, where he sent an order to the governor and Jeyur joins Bin Mukih Bin Bisayah to come and proffer his obecassim.

dience. He replied, "If I do so I incur the displeasure of Dahir; in a certain place at uncertain time, I will come forward with a certain number of troops; direct your men to attack me, and I will appear to oppose them, and then allow myself to be taken prisoner." Thus did Mukih at that place become obedient, and was

taken into great favor: he shewed the road (to conquest.) They relate that the Rahi Dahir, hearing of the power of the army of Islam, prepared with a large force to oppose the Dahir opposes the passage of the Mospassage of the river. A party of the Moslems were lems on the Indus. crossing, Dahir himself killed one with an arrow. He left Jahamin Budah there, and himself retired; Jahamin took such strong possession of the passage of the river, that it became difficult. At this junction Chundram Halah, who was formerly governor, seized Rebellion at Sewis- Sewistan from a party of horsemen of the Moslems who were left at that place. Mahamed Cassim on hearing this, despatched Ussúb Bin Abdul Rahim with a thousand horse and 200 foot to Sewistan. Chundram prepared to oppose them, and was defeated: he wished to escape to the fort, but the fort gates had in the mean time been closed, and he being frustrated, fell into the hands of the Moslems and was killed, (sent to perdition.) The Moslems then surrounded and took the fort, whence they rejoined Bin Cassim: Rahi Dahir sent his son Jaisisih to the fort Sewistan retaken, of Bat, to stop the road of the army of Islam; about and governor killed. 50 days were thus passed, and the Moslems began to suffer want, such horses as died of starvation were eaten. Dahir sent The Moslems suffer for want of provia messenger saying, "The state of your army is thus reported: if you wish well to yourselves I shall not oppose, but will perform my service (become obedient,) and you had better return." Mahamed Bin Cassim replied, "By the will of the Almighty, this country shall be a Mahomedan country, and until you come and proffer

obedience and pay the tribute of several years, I will never abandon my intentions respecting you." (I will never take my hands from you.) They say that Hijjaj in hearing the news of the loss of the horses, des-Hijjai sends rein- patched 2,000 others with strict injunctions not to forcements and orders delay in the important affairs of Dahir, but to pass to Bin Cassim. the river quickly and settle them first. On the receipt of these injunctions, Mahamed Bih Cassim having arrived at Juhum, directed them to collect boats for the passage of the river, and to make a bridge. Múki Bin Bisayah collected several boats, and filling them with sand and stones, and fastening Bridge of boats. them with wedges, made them firm one to the other. On this intelligence Dahir wrote to his son to arrest Múkî by some means for his evincing such audacity. Rail the brother of Muki was with Dahir, and having formerly been an enemy to his brother, said, "Entrust this order to me, and I will go and bring my brother; I will moreover pledge myself to prevent the passage of the river." At this time, by the help of God, the army of Islam having prepared the boats began to cross, and with showers of arrows dispersed the Infidels who dared to oppose them on the opposite shore. A large party arrived on the other side, and having cleared the shore of their The Moslems cross enemies, took up a position, until the rest of the army should have passed safely. It is said, that swift horsemen of the unbelievers, by travelling all night, conveyed the news to Dahir early the next morning: he was still asleep when they announced it; the groom roused Dahir, who, when he awoke from a tranquil sleep, was so much annoyed that he struck the messenger on the face so heavily with his slipper, that he died immediately. In short, Dahir being astonished and dismayed, knew not what to do: when Mahamed Cassim had crossed the whole of his army, he proclaimed to his troops-" The river is in our rear and the enemy in Bin Cassim exhorts front: whoever is ready to yield his life, which act will be rewarded with eternal felicity in such a cause, let him remain and have the honor of conflict; and any amongst you who, on second consideration, does not feel able to oppose the enemy, let him recollect that the road of flight is not open-he will assuredly fall into the hands of the Infidels, or else be drowned in the river, and thus suffer disgrace, which is the worst of all evils in religious

or worldly matters; but still, let these now take leave, for brave men determine either to conquer or die." Of the whole force only three persons, one under a pretence of an unprotected mother, another of a motherless daughter, and a third of want of means, left; the rest declared they were only anxious for battle.

At length Mahamed Bin Cassim perceiving the unanimity of his troops directed a march from that place, and from the fort of Bat arrived at Rawur; he arrived at a place called Jeyur. Now between Rawur and Jeyur there was a bay, on passing which they came in First view of Da. sight of Dahir's forces; Mohazar Bin Sabit Kisi hir's forces. with 2,000 and Mahamed Ziad Abdi with 1,000 troops, were directed to oppose them: they drove the enemy back. At this time, Dahir called Mahomed Haris Allasi and represented, "For advice in such a day as this have I protected you; now you must exert yourself and take charge of the advanced party." Mahomed Haris replied. "Indeed I acknowledge that I ought to exert myself to the utmost, but there is the necessity of opposing Mahomedans, and to become The Allafi chief re- renegade, sell my religion for gold, to have on me fuses to oppose the the blood of Mahomedans, and when I die to go to army of Bin Cassim. perdition; spare me, I pray you, the performance of these tasks: any other duty I will perform with my life." Dahir was disconcerted, and remained silent. He sent Jaisish with a large party of troops to oppose the enemy, but after the loss of the greater portion he was defeated and returned. The next day the brother of Múkí was appointed, but he secretly sent a message saying, " Take me in battle as you have done my brother:" and they did so. Thus for ten days in this way the Infidel forces came out to battle, and, being defeated, returned.

In the meantime the victorious Moslems besieged Dahir in his own stronghold, and on the 11th day, which was Thursdalor.

Bin Cassim besieges day the 10th of the month Ramzan in the 93rd year of the Hejira, Dahir notwithstanding the prohibitions of the astrologers came out himself with a powerful force; he had 10,000 horse with armour, and 30,000 foot with many war elephants, (on one of which)

Dahir gives battle. Dahir was seated in a howdah with two beautiful girls handing him wine, and fanning him. They contended fiercely from morning until night, and the Moslems so plied their rockets and arrows that it could not be exceeded.



At first the army of Islam became confused; Mahamed Bin Cassim became alarmed, and offered up prayers to the Most High, who favored him, and gave him at length the victory. They relate, that Bin Dahir had at all times during the battle an iron mace in his hand, with which he cleft the head of every horseman against whom he launched it; but at length on the approach of the Arabs, when he wished to leave the battle, the war elephants became frightened at the rockets of the Moslem troops, and fell amongst their own soldiers, who were thus destroyed. A party of the Infidels demanded quarter, and said "The army of Dahir is now confident and careless; give us troops and we A party of the Infi. will take them in the rear, and break their pride and dels desert.

In this way the ground was cleared and the enemy broken.

By the power of the Almighty an arrow struck Pahir in the neck Death of Dahir. and killed him; they drew his elephant to the rear, but by chance the elephant stuck in the mud of the river, and they all tried to conceal the King's position. The army of the Infidels being defeated, the Moslems so guarded all the approaches that a bird could not have flown past. The Brahmins fell into the hands of Keiss, and to preserve their own lives reported the death of Dahir. At this time

Certain Brahmins reported the death of Dahir. the two daughters of Dahir were captured by the Moslem troops. Mahamed Bin Cassim fearing lest
Dahir should escape, caused a proclamation to be

issued, that they should close to the rear to prevent the concealment of the enemy. Keiss hearing the proclamation called aloud on the Most High after the Mahomedan fashion, and the whole army taking it up, Bin Cassim became aware of the death of Dahir. He came with some of his warriors to the edge of the mud, and on the testimony of the Brahmins took the polluted body out; he cut off the head and stuck it on a spear,

The body of Dahir shewing it to the daughters for their confirmation discovered. (of his death). He then directed, that the army should occupy itself all night in prayer and thanksgiving for the Divine favour, and in the morning of Friday he sent Dahir's head with his two daughters to the gate of the Fort. The defenders of the garrison declared it was false. Sadi the wife of Dahir, having from the top of the palace seen the head of her husband, became insensible, and uttering a loud cry, threw herself off (the palace:) in short, the people in the

The Moslem army a sort of pulpit in the temple, performed the prayers enter Alor. They then took possession of the riches and property of every kind, and constituted Keiss the keeper of these. In the beginning of the month Shawal after the settlement of all that territory, they sent the head of Dahir with his daughters, the prisoners, and the wealth with 40 horsemen accompanied by Keiss to the Khali-

Dahir ruled for 33 fat capital. The period of the rule of Dahir was 33 years, and the Brah-years, and the whole time occupied by the dynasty of the Brahmins was 92 years.

It is related, that after the death of Dahir the men of Samah from the neighbourhood of Thurri\* having collected, came with tabours and clarions and proffered their allegiance, and began to dance: Mahamed Cassim asked who they were, and what they were doing. They replied, "This is our custom, that when a Monarch is victorious, we thus testify our joy." They returned. And the Bhattias, Lohanas, Sahutahs, Jundurs, Machees, and Kurejurs†, introduced by Alli Maha-

Tribes who pay homage to Bin Cas- with head and feet bare. After their pardon had been pronounced, it was decreed that whenever any of the Mahomedans should come from the Capital of the Khalifs or go in that direction, these tribes should be their guides and be answerable for their safety.

Then Mahamed Bin Cassim, with the sanction of Hijjaj, took to wife the sister of Dahir, (whom the latter had married through fear of losing his country,) and proceeded to acquire other territories. At this Sons of Dahir retime at the commencement of the year 94, it was announced that the sons of Dahir had possessed themselves of the fort of "Sikundar," and had assumed independence. Mahamed Cassim proceeded in that direction, and endeavoured to reduce the fort; after many engagements he took complete possession, destroyed the temples, and laid the foundation of Musjids, and directed certain punishments to be inflicted on the inha-

<sup>\*</sup> Thurr or Thulli the little desert separating Sindh from Cutch.

<sup>†</sup> These last are Jhutts, the cultivators of the soil and rearers of cattle in contradistinction to the Beloochees who are foreigners; they are doubtless the aboriginal Hindoos converted to Islamism.



bitants. He also in the same way subdued Barhamanabad; they say that one day Mahamed Cassim was sitting, when an assemblage

The Brahmins repre- of Brahmins, about 1,000 in number with their sent their claims to heads and faces shaven, came into the camp. On follow their religious customs: the same enquiring their case, he learnt that they were mourning for their chiefs as is their custom. Hav-

ing called them, on the advice of Sadt the wife of Dahir, he sent them all as formerly to be collectors in the districts. In their helplessness they represented that they were a class of idol worshippers, and belonged to idol temples: " Now we have accepted obedience to you, and acknowledge our amenability to tribute, you must give us leave to erect our places of worship elsewhere, and to pray for the prosperity of the Khalif." Mahamed Cassim, after having represented the case to Hijjaj, who reported it to the Khalif, gave the permission required, that they should act according to the usages of their ancient faith. He then ordered that, to distinguish them from other Hindoos, they should carry in their hands a small vessel of grain as mendicants, and should beg from door to door every morning. This custom still remains, and all the Brahmins carry the khulsal.

It is related, that when Hijjaj heard of the conquest of the fort of Sikundar and Barhamanabad, he wrote to Mahamed Cassim, "Since by the blessing of the Almighty, Dahir and his country had been taken, you must also take the Capital city; and not rest satisfied with that, but turn to the east and proceed towards Hind, and by the blessing of the Mahomedan religion it will every where protect the Moslems. On this order, Mahamed Cassim set about the settlement of Alor.

Dahir.

In the disorder of affairs, news arrived that a son of The sons of Dahir take possession of Alor, Dahir was strong at Alor, having denied the death and deny the death of Of Dahir and reporting that he was only lost of Dahir, and reporting that he was only lost from his troops, and had gone towards Hindostan

whence he would soon arrive with an army and take revenge. So implicitly did he believe this, that whoever mentioned the killing of his father to him, was destroyed. Thus few alluded to the subject in his presence. He called to him his brothers Jaisisih and Wukiah, who in the tumult of affairs had been dispersed. Bin Cassim proceeded in that direction, and besieged the fort of Alor; he sent Sadi the wife of Dahir to the gate of the fort, in order that she might explain the

No. 158. death of Dahir. They called her a liar and stoned her, saying "You have become one of the eaters of cows." The siege was prosecuted, and the inhabitants of Alor soon began to suffer for want of food; they meditated surrender, Fufi began to think that there was no chance of his succeeding, but a false hope prevented his withdrawing. They say, that there was a sorceress in that place; they requested her to give them intelligence of the death of Dahir. This woman, whose name was Jokiú, asked for one night's delay, and after that she came into the presence of Fufi with two green branches of Jow and Filful trees and said, "I have searched every span of earth from Sirundip, and have brought this reply, that if Dahir were alive I should certainly have seen him; do not entertain the idea, and do not heedlessly and unprofitably doom yourself to destruction." When Fufi knew for certain from the sorceress, and became convinced of the death of Dahir, he left the fort at night and fled to his brothers whom he had called to him, but who had not yet arrived. In the morning the Allasis sent the intelligence by letter to Mahamed Cassim, and called for a promise Bin Cassim enters of pardon for themselves; they directed the holders of the fort to open it, and Mahamed Cassim with his victorious army entered the city. He saw a large assemblage of the people prostrating themselves in the place of worship; he asked what they were doing, he learnt that they were paying adoration to an idol, and entering the temple he saw a well-formed figure of a man on horseback: he drew his sword to strike him, but those who were near him cried out, "It is an idol and not a living being." Making way for Mahamed Cassim he advanced to the Idol, and taking off one of his gauntlets he said to the Bin Cassim reproach. spectators, "See in the hand of the Idol there is this one gauntlet; ask him what he has done with the other." They replied, "What should an Idol know of these things." Bin Cassim said, yours is a curious object of worship, who knows nothing even of himself. They were ashamed at this rebuke. In short, after the capture of Alor which was the capital of the country, the rest of the dependencies became tranquil, all the inhabitants were grateful to Bin

Cassim\*, and pursued their former avocations. He appointed Hurún

<sup>.</sup> There is an apparent inconsistency in our author here, for he tells us that Alor was taken by Bin Cassim when Dahir was overthrown, and does not account for the Rajah's sons getting possession of it, and its being necessary to recapture it. Bin



Bin Keiss, Bin Rowah Assidi, to the governorship of Alor, and the Various governors rank of Cazi he conferred on Mussa Bin Yakrib, Bin appointed. Tahi, Bin Nishban, Bin Ashman Sakufi, and he appointed Widah Bin Ahmid al Nijdi to the command of Barhamanabad, and Nobah bin Daras to the fort of Rawur, and the country of Korah he gave to Bazil Bin Hillazuwi. Then he turned towards Multan; and in the course of the journey, at the fort of Bahiyah, Kulsur Bin Chundur, Bin Tillabij a cousin of Dahir's, who had been at enmity with Dahir, and was remaining at that place, came out and tendered his allegiance. After that, they conquered the fort of Sukkur, and Atta Bin Jamahi was left there as Governor, and having seized Multan with its dependencies and fortified places, Khazimah Bin Abdul Mulk, Bin Jumim was left at Mahpur, and Daud Bin Mussarpur, Bin Walid Himmani, was appointed to Multan. Mahamed Cassim then proceeded towards Dibalpur, and he had at that Mahamed Cassim extends his conquests. time nearly 50,000 horse and foot under his banners, independent of his former regular army; in short, he conquered as far as the confines of Kunnoj and Cashmir, and saw those two cypress trees which had been placed by Dahir.

Everywhere he left trust-worthy agents and returned to Yassur\* where it was decreed by fate that his life should terminate.

### ( To be continued. )

Cassim had otherwise proved himself too good a General not to have provided for the security of the Capital of the country when once in his power to render its falling into the hands of the enemy at all likely.

\* In the Chach Nameh \* Hadapoor."



Védánta-Sara, or Essence of the Védánta, an introduction into the Védánta Philosophy by Sadánanda Parivrájakáchárya, translated from the original Sanscrit by E. Roer, Librarian to the Asiatic Society of Bengal.

#### PREFACE.

Of the Védánta-Sara two translations have already been published, one by Mr. Ward, (in his work View of the History, Literature and Mythology of the Hindoos) and the other in the German language, by the late Professor O. Frank. Ward's translation, which is evidently not taken from the Sanscrit, is very far from conveying a fair likeness of the original to the reader, and I need only quote the opinion of Colebrooke with regard to it, to prove its entire failure as a correct rendering of the original\*.

The German for which we are indebted to O. Frank, was published together with the original text, in 1835; but, however creditable it is to the author, it is also inexact as a translation. Although a good Sanscrit scholar, and one of the first in Europe, who devoted his talents to that language, he had to struggle with the difficulty of ascertaining the real value of its technical terms, a difficulty which he had hardly the means of removing; for in Professor Wilson's excellent Sanscrit Dictionary, only a few philosophical terms are explained, and without an explanation of such terms by pundits, or an extensive course of reading, the

<sup>\*</sup> Transactions of the Royal Asiatic Society Vol. II, p. 9. note. Mr. Ward has given, in the fourth volume of his View of the History, Literature and Mythology of the Hindoos (third edition,) a translation of the Védanta-Sara. I wish to speak as gently as I can of Mr. Ward's performance, but having collated this, I am bound to say, it is no version of the original text, and seems to have been made from an oral exposition through the medium of a different language, probably the Bengalese. This will be evident to the Oriental Scholar on the slightest comparison, for example the introduction, which does not correspond with the original in so much as a single word, the name of the author's preceptor alone excepted; nor is there a word of the translated introduction countenanced by any of the commentaries. At the commencement of the treatise too, where the requisite qualifications of a student are enumerated, Mr. Ward makes his author say, that a person, possessing those qualifications, is an heir to the Veda; there is no term in the text, nor in the commentaries, which could suggest the notion of heir, unless Mr. Ward has so translated adhicari, (a competent or qualified person) which in Bengalese signifies proprietor, or with the epithet uttara, uttara adhicari, heir or successor. It would be needless to pursue the comparison further. The meaning of the original is certainly not to be gathered from such translations as this, and (as Mr. Ward terms them) of other principal works of the Hindoos, which he has presented to the public.



exact metaphysical meaning of them must remain problematical. Besides O. Frank is the disciple of a particular philosophical school, that of Hegel, and has very often coloured the ideas of the original so as to correspond with his own system. I hope, therefore, that I have not undertaken a useless task, in bringing before the public a third translation, in which it has been my constant endeavor to render the original as faithfully as possible. For the language of this translation, I have as a foreigner to solicit the indulgence of the reader; and, independently of other considerations, it will be remembered, that English in itself presents difficulties, in rendering with exactitude the real force and meaning of Sanscrit philosophical terms. As regards, however, the language of the preface, I am much indebted to the valuable assistance of Mr. H. Torrens, V. P. and Secretary to the Asiatic Society, and I take this opportunity of acknowledging my great obligations to him.

In publishing this translation, it is my principal object to attract the attention of the public once more to a branch of Hindoo learning, which, successfully cultivated as it was by Colebrooke, has been of late almost entirely neglected. The researches of that eminent scholar, as in other departments, were also with regard to the philosophy of the Hindoos, of the most comprehensive character. He not only gave a general sketch of the different systems of their philosophy, but also a critical introduction into this branch of Hindoo literature, almost entirely unknown before his day. As his labors then created extensive interest in Europe, it is much to be regretted, that these researches were afterwards but lamely followed up. The Germans indeed did as much as the want of material allowed them. I here allude to the researches of the two Schlegels (Fr. and A. W. von) W. V. Humboldt, Ritter, (in his History of Philosophy) O. Frank, Lassen and others, who published either original texts, or translations, or critical treatises. But however meritorious these labors were, most of them, as founded upon Colebrooke's works, could not much enlarge our information on Hindoo philosophy. For this object the publication of Sanscrit texts, or translations was necessary, which were looked for chiefly from India and England. Here, however, it appears, that the interest in Hindoo philosophy was only enforced by the name of Colebrooke, as with him almost all further investigation ceased; for, with the exception of Professor Wilson, who edited Colebrooke's translation of the Sankhya

Karika, and translated the native commentaries on this work, no one has published any work of importance with regard to Hindoo philosophy. Without endeavoring here to enlarge on the causes of this neglect, I must not omit to touch on the principal one-the want of encouragement, with which philosophical researches are met in England. The study of philosophy is of its very nature adapted but to few; but even they will be deterred from it, if that part of the public, to which they are to communicate the results of their enquiries, is totally indifferent to them. If philosophy generally be but in little repute in England, it is easy to conclude, what must be the neglect of the systems of the Hindoos in particular, which, it appears, are entirely superseded by the much more elaborate systems of Europe. The Hindoos, it is said, are acute enough in nominal distinctions, but their enquiries, originating from an absurd and gross superstition, recur only to this root, instead of explaining the phenomena of nature. Without entering into a full discussion of this subject, I may be allowed to observe, that this view would at once destroy all historical study. On account of their historical interest, we not only direct our attention to the works of Grecian art, but also to those of Egypt, Etruria, Persia, Peru and of other countries, because they show us the characters of those nations in different states of civilization. If these possess a general interest, Hindoo philosophy is a monument, which must claim the attention of every enquiring mind, as it reveals to us the inmost character of the nation, closely interwoven as it is with all institutions of public and domestic life, with their literature, religion and their views of the means, by which their moral welfare might be advanced or retarded. But waiving this general interest, we must be aware of the connexion of Hindoo philosophy with the development of European science, by the new platonic philosophy, which evidently contains the principles and results of Hindoo philosophy, a connexion which can be only fully understood, when we know more of the history of the Hindoo systems.\*

The Védánta-Sara is an abstract of the doctrines of the Védánta philosophy, and expounds more particularly those tenets which are ascribed by Colebrooke to the modern branch of this school. It comprehends in a very condensed form the whole range of the topics, which are discussed more fully in the different works of this school. The ob-

<sup>\*</sup> Ritter's Geschichte der Philosophie. Vol. 4, p. 44.



scurity, which prevails in some passages, is rather owing to the concentration than to the indistinctness of the ideas. The principles of the system are clearly laid down, and though in a few passages there is a deviation from them, they are never lost sight of. Other philosophical systems are only touched upon, when it is the object to prove their principles to be entirely inconsistent with themselves and with each other. The demonstrations, though short, are perspicuous, and sometimes even elegant. The illustrations are generally well selected and striking; and, if we consider the work to be rather of a descriptive than of a argumentative character, we must acknowledge, that it is a most excellent introduction to the study of that philosophy.

The following exposition is intended to place before the reader the chief metaphysical topics of this work and to compare the doctrines, explained in it, with those philosophical systems, Hindoo as well as European, with which it has an affinity in its principles. There exists according to it only one eternal and unchangeable being, who has the attributes of existence and consciousness. The manifold distinctions in what may be called, the material and intellectual worlds, are together with those worlds, mere είδωλα, produced by unconsciousness,\* (which objective is something analogous with matter, and subjective a want of clear perception of the unreality of all material objects.) For example, if you reflect on the reality of the world, you find it has none, because it is changeable throughout; all reality is centred in one being, who is beyond change, and concerning whom there is not even change or plurality of ideas, as it includes no distinctions in itself. Thus of the supposed reality of the world, nothing remains; naught exists but mere ἔιδωλα, which, in contradistinction with the knowledge of Brahma (or of the infinite being without plurality,) may be called ignorance or unconsciousness. It is the principal work of philosophy to destroy this ignorance, or to unite our finite being with the infinite Brahma, or in the words of the Védánta, to know ourselves as Brahma. It

<sup>\*</sup> The words consciousness and unconsciousness do not express the full meaning of the corresponding Sanscrit words. Consciousness means the knowledge of what passes in the mind, that is, a reflected knowledge, while the Sanscrit term refers to knowledge in general. As Colebrooke, however, has used in his essay those words, I thought it better not to introduce another terminology, and have only to remind the reader, that consciousness and unconsciousness are here always to be understood in the more comprehensive sense.



is, however, impossible for any individual immediately to obtain this true knowledge, as any idea, which we may conceive of Brahma, previous to the performance of the conditions, conducive to that knowledge, must be one of the various illusions, which are created by ignorance in our minds. The true knowledge can only be obtained by a systematic method, which is twofold, theoretical and practical. The theoretical method is the direction of there flective power upon Brahma, and it proceeds first synthetically from the infinite substance to the Eίδωλa or appearances, showing the various modes, in which Brahma is successively represented by unconsciousness; and secondly analytically, from the manifold creations of unconsciousness to the infinite substance, successively showing the unreality of them and returning to Bramha as the only source of reality. The practical method presents the means, by which our senses, passions, and thoughts are subdued; the mind is gradually detached from worldly concerns, directed to the performance of good acts alone, and finally fixed upon the contemplation of God.

It is remarkable, how in the principle itself the fallacy of the system is manifest. If Bramha be the only real being, all other things (material or immaterial) are unreal, and this inference is expressly recognized, there should be not even the appearance of an existence of them; but it is also said, that those things must not be considered as nothing; so that they have, to say so, a kind of imperfect existence, but still an existence, which cannot be derived from the infinite Bramha. In short, there is not one principle, but, against the express assertion of the Védánta, two principles, the infinite, unchangeable, omniscient being, and the finite, changeable and unconscious being. This is also evident from the consequences; for the world or its appearance is not produced either by Bramha or by unconsciousness, but by their mutual causality; for in Bramha only, when clouded by the mists of ignorance, is the spectacle of a world produced. According to this exposition of the theory, which must, I think, be allowed to be correct, Bramba would coincide with the notion, which occidental philosophers form of substance, and unconsciousness with that of attributes and modes.

What is called unconsciousness, has, however, a twofold meaning; according to one, it is delusive appearance, by which unreal things are represented as real; according to the other, it is the origin of the actual world. We shall consider only this second meaning, which we



will endeavour clearly to define. It is evident, that an adequate notion of that origin can only be obtained from its productions, as the nature of the cause is perceived by the nature of its effects, and this mode of inference we may the more insist upon, as the inductive process is recommended by the system as one of the means, whereby to arrive at true knowledge. Now the Védántists hold, that unconsciousness causes the emanation of five elements, ether (ákása,) air, fire, water and earth. These elements, though subtile and imperceptible to the senses, have material qualities, and are therefore themselves special kinds of matter. To know their origin, we have then to divest them of their special qualities, by which we arrive at the notion of matter in general (separated from all differences of space and time,) and we must therefore say, that unconsciousness and the general notion of matter are virtually the same, a necessary inference, however, but one which the Védántists took care to avoid, because the vague notion of unconsciousness suited admirably as a cloak to the radical error of their system.

As it is here my object to place before the reader the most prominent characteristics only of the system, I am not to enter into the various emanations from unconsciousness, but will at once state the opinion, which the Védánta forms as to the highest form of knowledge, to which the individual mind can aspire, and which in fact is a consequence, necessarily derived from the first principles of the system. When we have perceived, that all the emanations of unconsciousness are unreal, when we are able to distinguish in the universal as well as in the individual soul, that which is real and eternal from the unreal and the transient, then is our notion of Bramha firmly and adequately established, in the knowledge, that the individual soul is the same with the eternal Bramha, as the differences, which at first sight seemed to exist between them, became gradually destroyed by the progress of reflection. But even this adequate notion of Bramha, as an act of the mind, is included in the emanations of unconsciousness, and it is therefore an unavoidable inference, that this act also, when once arrived at, should be destroyed as one, though the purest and highest, of the emanations of unconsciousness, when the individual soul, comprehending its reality, returns to Bramha, with whom it is identical.

The philosophy of the Védánta, as explained in the Védánta-Sara, differs undoubtedly from the more ancient expositions of this doctrine,

and I fully concur in Colebrooke's opinion, that the attempt to proclaim the material world as mere illusion, had not originated with the founders of the Védánta. The centre on which all Hindoo philosophy depends, is the opposition between the phenomena of the mind and of the body, by which they were led even in early times, as it appears, to maintain the existence of two principles, soul and matter. This is likewise observable in the Védánta; soul and matter, though produced from one and the same substance, are at first real productions, which have the same claim to existence, and only at a later period, when on comparison of both with the substantia absoluta their reality came to be questioned, the reality of matter was denied, and the expedient of an illusion was resorted to, in order to explain its existence.

The Védánta in general differs from the Sankhya; the two systems assimilate in their explanation of productions of the material world; but while the Sankhya lays down the original independent existence of spirit and of matter, the Védánta derives both from one and the same substance, in which their differences are destroyed. The two schools of the Védánta, the ancient and modern, agree as to this substantia absoluta; the material productions, however, derived from it, though created in the same successive order, are differently explained; they are real productions according to the ancient school, while the modern one believes them to be a mere illusion, produced by unconsciousness.

Among the various systems of the Greeks, we can only find that of the Eleates, with which we may compare the principles of the Védánta. We there perceive the same all comprehensive substance, which has the same attribute of eternal, unchangeable existence which is without differences, either with regard to itself or others, and the sole attribute of which is thought. We also find in the disputes of the Eleate Zeno with other Greek philosophers the same inclination to consider all material things as mere illusion. But I abstain from further comparison of the systems, as the Védánta treats of the subject matter synthetically as well as by analysis, whereas the Eleate school has confined itself wholly to the latter process.

The modern Védánta bears the closest affinity to the system of Spi-

<sup>\*</sup> Though it appears a matter of course, that all philosophers should commence from these principles, history shows the reverse. Thus, Greek philosophy was at its commencement entirely physical.

noza. His Bramha is that infinite substance with infinite attributes, beside which there is nought else existing, though he so far differs from the modern Védántists as to assign to it two attributes, that of thought, and that of extension, which the Védántists of that school deny the existence of.

They maintain a perfect Ens or a real unity without any element of opposite qualities. Spinoza indeed asserts, that his Ens Cogitans is identical with the Ens Extensum, difference existing only in the perception of the whole under the one or under the other attribute; but on the other hand he also asserts, that each attribute must be understood of itself, that is to say, that it has no relation whatever to any other attribute.\* Though the Védánta philosophy in this instance is evidently more strict in the definition of the principle, it deviates from the original purity of its notion, when attempting to explain the phenomena of its world.

Both systems present likewise a singular coincidence in the mode, by which they connect finite things with infinite substance. Spinoza declares it altogether impossible to derive finite things from infinite substance, because any finite substance is only finite, if determined by another substance of the same kind, that is, infinite substance is always co-existent with finite things.† The Védánta-Sara maintains also, that the perception of Bramha as one whole or as many parts, depends merely on the accident of that perception; if perceived as one, it would be one; if perceived as many, it would be many; but in the latter case the unity of entity would be in no sort destroyed or altered. Here likewise we find a plurality of material objects, not derived from the one whole (which has the attributes of infinity, eternity, &c.,) but co-existent in it, so

<sup>\*</sup> Though it should be hardly necessary to make quotations in such a general sketch as this, still it may be not found useless to confirm some of the above assertions. Per attributum intelligo id, quod intellectum de substantia percipit, tanquam ejus essentian constituens. Spin. Eth. I. Def. 4. Unumquodque unius substantia attributum per se concipi debet. Eth. Prop. 10. Duae attributa, realiter distincta, per se concipiuntur, idest, unum sine ope alterius. Eth. Def. 3.

<sup>†</sup> Quodcunque singulare sive quavis res, quae finita est et determinatam hæbet existentiam, non potest existere nec ad operandum determinari, nisi ad existendum et operandum determinetur ab alia causa, quae etiam finita est, et determinatam habet existentiam; et rursus haec causan on potest etiam existere, neque ad operandum determinari, nisi ab alia, quae etiam finita est et determinetur ad existendum et operandum, et sic in infinitum. Eth. I. Prop. 28.

that both views are essentially the same: this way of reasoning, however, must not be applied to the pure Bramha. Here then both systems differ, and if we must assign to the Védánta the meed of greater purity in its principle, we must expressly state, that in the development of the system Spinoza is as infinitely superior to the Védánta as the science of his time was to that of the Hindoos generally.

It is easy also to find many points of resemblance between the modern Védánta and the doctrines of Fichte\* and Schelling; as the world, being a production of Maya, or unconsciousness, and according to Fichte, being a phenomenon of the Ego in its different modes of considering itself, and Schelling's negation of the nothing by the absolute substance, his absolute Selbstbejahung, compared with the infinite Bramha, without whom nothing exists, are ideas closely related; but we abstain from further comparisons and conclude this introduction with some remarks on Hindoo philosophy in general.

We must acknowledge the ingenuity and originality of thought, by which this system was brought forth. It is evidently not a primitive notion of the mind, such as might almost arbitrarily assign a general cause to certain phenomena, which provoke reflection. It is an elaborate system, in which the principle and the method are clearly defined, and the inferences are fairly deduced, and compared with the original impulses, by which reflection was called forth. It is also evident, that such a doctrine, especially as it was considered as the last goal of perfection by all classes, must have had a powerful influence in the formation of individual character as well as on the civilisation of the people; for to obtain its final object, purity of the moral character was indispensable. It is, to confess the truth, a philosophical system, elevated, far above the crude notions, connected with national superstitions, above the prejudices of caste, as well as above the formalities of ceremonial worship; for the supreme substance is only known by a continued

<sup>\*</sup> Fichte, in asserting that the external objects are merely productions of the ego, appears to be most closely connected with the modern Védánta. This is, however, not the case. The Védnátists maintain the world to be appearance, because it cannot be considered as real: Fichte, on the contrary, from its being a mere appearance in the Ego, argues its unreality. This Ego moreover, as the identity of subject and object, is very different from any doctrine in the Védánta, and the idealistic principle, from which it appears to proceed, is only pretended, as the phenomena of nature are in fact derived from a realistic basis.



and methodical direction of the reflective power of the mind upon it, and the Sankhya expressly asserts, that the religious ceremonies and doctrines of the Védas are not sufficient for final salvation.\* It is, however, not surprising, that similar effects were not produced by the philosophy of the Hindoos, as by that of the Greeks. In Greece no caste existed; men of science rose from all classes of the people, and the work of the higher faculties of the mind was not restricted to the priests. When therefore philosophers found the religious doctrines of their people inconsistent with sound reason and morality, they did not hesitate to pronounce them as such, and to demonstrate their pernicious effects upon the moral and religious principles of the people. † In India, on the contrary, the cultivation of science was incumbent on the priests alone, and if the results of their enquiries were strongly opposed to the religious prejudices of the people, their whole position most forcibly recommended them to conceal what they considered truths, because destructive of those very prejudices, whence they derived their privileges and subsistence. Thus influenced on the one side by the power of truth to the revelation of their opinions, on the other by worldly advantages to their concealment, they followed a middle course, that is, they endeavored to reconcile the tenets of religion with their philosophical views, without deserting the consistency of their principles. By this proceeding must religion, of course have been degraded from its state of sublime agency, as advancing the best interests of mankind, to becoming the base instrument of delusion on uncultivated minds, while philosophy lost its dignity and genuine character, being mixed up with a corrupt theology, and the distance between the learned and the people in general became the wider. It was only one of the consequences of such a position, that the common people by nature and law were unfit to enjoy the knowledge possessed by the privileged castes. Owing to the exclusiveness of science it is another consequence, that philosophy in India was more directed to theoretical contemplation than to practical purposes; the Greeks as well as the modern European

<sup>\*</sup> This is in fact also maintained by the Védánta, absorption into Brahma being the final end of an individual intelligence, and all efforts which are not directed to this end, retarding it in a more or less degree.

<sup>†</sup> Sextus Empir. Adv. Math., where he speaks about Xenophanes, and Clem. Alex. Chrom. V. Xenophanes; but the principal passage, and perhaps the best, what has been said on the pernicious results of polytheism, Plat. Repub. Lib. II.

nations, on the contrary, bestowed the same attention upon practical as on abstract questions; for while, according to the one, it is a duty of mankind to remain in social connexion, a duty which should even be enforced, it is, according to the other, the highest privilege of the wise to separate himself from all social connexions, to endeavour at a total abdication of the impulses and motives for action, which the world or our ownselves can present, until the soul has arrived at that condition, in which it returns to the source of all truth and reality, and in which the individual becomes annihilated by absorption into the great origin of all things, who is all, and in whom all are included.

#### Salutation to Ganésha.

For the accomplishment of my desire I take refuge to the soul, infinite in reality, in knowledge and in bliss,\* the place of the universe, which neither by word nor thought can be approached.

Having worshipped my teacher Adwyananda, t who by overcoming the notion of duality, is in truth so named, I shall expound the Essence of the Védanta according to my understanding.

The name of Védánta applies to such arguments as are taken from Védánta. the Upanishads‡ to the Shárírikasutras§ and other similar Shastras, which tend to the same end.

As this work is an introduction to the Védánta, it need not se-Category. paratedly explain the categories, by which the Védánta is completed. There are four categories in the Védánta, the qualified person, the object, the connection, and the final end.

<sup>\*</sup> This may also be translated, "the infinite, eternal, omniscient, blissful soul," or "the soul, which is the bliss of infinite being, and knowledge." I here observe, that the soul is not something different from those predicates, but the identity of reality, knowledge and bliss.

<sup>†</sup> Adwyananda means who finds his felicity in non-duality.

<sup>‡</sup> Upanishad, the theological part of the Vedánta, or argumentative part of the Védas. Wilson. The commentator, Rámakrishna Tírtha remarks, that it is the object of the Upanishads to explain the unity of the universal and the individual soul.

<sup>§</sup> The Sárírika, Mímánsa, Brahme-sútra or Sáríra-sútra, above mentioned, is a collection of succinct aphorisms, attributed to Bádaráyana, who is the same with Vyása, or Védavyása, also called Dwaipáyana or Crishna-dwaipáyana. Colebrooke, Tr. R. A. Soc. Vol. II, p. 3.



A qualified person is he, who by the perusal, as it is prescribed, Qualified person. of the Védas and Védángas having first obtained the true sense of all the Védas, who in this or a former life having renounced the objects of desire, and the works which are forbidden, who by observing the daily ceremonies as well as those prescribed on certain occasions, the expiations and acts of internal worship, being liberated from all sin, and therefore thoroughly purified in his mind, and who having performed the four means, has become perfect in knowledge.

Objects of desire, as for instance the Jyótishtómas\*, are such as are

Objects of desire.

# कान्यानि

and of aversion.

# निषिद्वानि

Daily ceremonies.

### नितय नि

Ceremonies on certain occasions.

## नैमित्तिकानि

Expiations.

## प्रायश्चित्तानि

Acts of worship.

## उपासनानि

means of obtaining heaven and other desirable objects; prohibited is what causes (the punishment of) hell and other undesirable objects, as for instance the killing of a Bramhan. Daily ceremonies are for instance the Shandhyábandana† which to omit is the cause of sin. Ceremonies on certain occasions are for instance the Jatéshtya and others for the birth of a son. Expiations are for instance the Chandráyanas,‡ which are causes of removing sin. Acts of internal worship, for instance such as originated from Shandilya, are actions of the mind, whose object is Bramha, united with the three qualities. The principal fruit of the parts

the daily ceremonies is the purification of the mind, that of the acts of internal worship is the fixing of the mind upon Bramha.

"It is him, whom the Bramhans by the word of the Védas and by religious austerities wish to comprehend," says the Sruti.

"By austerities sin is destroyed; by knowledge, immortality obtained," says the Sruti.

\* A particular sacrifice, at which sixteen officiating priests are required. Wilson's Sanscrit Dict.

† Religious abstraction, meditation, repetition of Mantras, sipping of water, &c to be performed by the three first classes of Hindoos at particular and stated periods in the course of every day, especially at sunrise, sunset, and also, though not essentially, at noon. Wil. S. D.

‡ A religious or expiatory observance regulated by the moon's age, diminishing the daily consumption of food every day by one mouthful, for the dark half of the moon, and increasing it in like manner during the light half. Wil. S. D.

The secondary fruit of the daily ceremonies, of those enjoined on certain occasions, and of the acts of internal worship, is the gaining of the world of the forefathers and of the celestials.

" By works the first is obtained, by knowledge the latter," says the Sruti.

Means are : First, the distinction of the real from the unreal thing; Secondly, the disregard of the enjoyment of fruits (arising from works) as well in this as in a future life; साधनानि Thirdly, tranquillity of mind, self-restraint, &c.; Fourthly, the desire of emancipation.

The distinction of the real from the unreal thing, is to know, that

नित्यानित्य वस्त विवेकः

Distinction of the real from the unreal thing.

another world.

Bramha is the real thing, and beside him all is unreal. Disregard of the enjoyment of the fruits, arising from works, in this as well as in a future life, is entirely to renounce the enjoyment of things of this world, as for instance, of wreaths or Disregard of enjoy-ment in this as well as in sandelwood, &c. which are transient, because they must be obtained by works, as well as to renounce

the enjoyment of things of another world, as for instance, of the juice of immortality, &c., because they are also transient.

Means of self-command are, a. tranquillity of mind, b. self-restraint, c. Means of self-command. resting, d. endurance, e. religious contemplation

Tranquillity of mind. and f faith. Tranquillity of mind. and f. faith. Tranquillity of mind is the refraining of the mind from objects of the ear and the other श्रम: senses, with the exception of such objects as refer to Bramha, (Bramha as united with the three qualities) self-restraint is the coercion of the Self-restraint. external senses from all objects, with the exception of such as refer to Bramha. Resting is to rest from all objects, when returning (into the mind) with Resting. exception of such as refer to Bramha, or to abandon, उपरतिः according to prescribed rules, all works that are enjoined. Endurance is the sustaining of cold and warm, and of all those Endurance.

sensations that have their contrary ones. Religious contemplation is to keep the mind fixed upon the hearing Religious contemplation. &c. of Bramha, and upon such objects by which this is facilitated. Faith is belief in the words समाधिः

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of the spiritual guide and of the Védánta. Desire of emancipaFaith. tion is the wish of liberation. He that is perfect in knowledge, having obtained this state of
mind, is called a qualified person.

"Tranquil in mind and self-restrained," says the Sruti, and it is also observed, "To him who is tranquil in his mind, who has subdued his senses, whose sins are removed, who acts according to the precepts (of the Shastra) who abounds in virtues, who is a follower of the teacher and strives for emancipation, to such a one must always this (the Shastra) be given."

II. Object, (of the Védánta,) is the unity of the sentient soul and object. of Bramha, the soul in its pure state, as to be proved from arguments of the Védánta.

III. Connection, between that unity as object of knowledge, and Connection. the Upanishads which explain it, is the relation between the object of knowledge and that which makes it known.

IV. Final end is the destruction of the ignorance which obtains
Final end. with regard to the knowledge of that unity (of
प्रयोजनं the individual and universal soul) and the gaining
of beatitude in accordance with his (Bramhás) being.

"Who knows the soul, overcomes misery," says the Sruti, and further,

"Who knows Bramha, becomes like Bramha."

That qualified person, being burned by the fire of birth, death and other worldly misery, as a person whose head is burning, takes refuge in the sea, repairs with offerings in his hand to the teacher who knows the Védas, and puts his faith in Bramha, and becomes his (the teacher's) follower.

"Holding (he) offerings in his hands, (repairs) to him who knows the Védas, and puts his faith in Bramha," says the Sruti.

II. Object. That teacher with deepest love instructs him by means of the improper transferring and of the true abstraction.

"To him, when arrived, thus spoke the teacher," says the Sruti.

<sup>\*</sup> Adhyarópa (the same with Arópa, Adhyasha, Bhrama) is literaly " placing upon," and signifies error with regard to the infinite being.

Improper transferring is the placing of an unreal thing upon Improper transferring. the real thing, as the placing of (the notion of) a snake upon a rope, which is not a snake.

The real thing is the eternal, omniscient, blissful Bramha, without Real and unreal thing. duality. The unreal thing is all, that is inanimate without consciousness.\* The thing without consciousness is according to some what cannot be explained by (the ideas of) existence or non-existence, according to others, the

something, composed of the three qualities, which exists, and obstructs knowledge.

I am ignorant, this and the like you perceive by reflection, and

Unity and multiplicity "you know the power of the soul, in which its

of the thing without own qualities are inherent," says the Sruti. This

consciousness.

(something) without consciousness by the ideas

of generality and speciality is perceived as one thing and many
things. For as by the application of (the idea) of generality to trees the

word forest in the singular number is perceived, or by the same notion

" Vide preface.

tommonly translated, quality, but more adequately degree of material existence. Guna is likewise here in the text not a quality of the thing without consciousness, but the three Gunas are its actual being. A Guna, as being the source of all derived material existence, can consequently not be explained, but by its effects. Lassen renders these three modes of existence by-essentia, impetus, and caligo. Colebrooke, Miscellaneous Essays, Vol. I. p. 249, says, with regard to them: "The Sankhya, as other Indian systems of philosophy, is much engaged with the consideration of what is termed the three qualities, if indeed quality is the proper import of the term; for the Scholiast of Capila understands it as meaning, not quality or accident, but substance, a modification, fettering the soul, conformably with another acceptation of Guna, signifying a cord. The first and highest is goodness, (sattwa.) It is alleviating, enlightening, attended with pleasure and happiness; and virtue predominates in it. In fire it is prevalent, wherefore flame ascends, and sparks fly upwards. In man, when it abounds, as it does in beings of a superior order, it is the cause of virtue. The second and middlemost is foulness or passion, (rajas or téjas.) It is active, urgent and variable, attended with evil and misery. In air it predominates, wherefore wind moves transversely. In living beings, it is the cause of vice. The third and lowest is darkness, (tamas). It is heavy and obstructive, attended with sorrow, duliness and illusion. In earth and water it predominates, wherefore they fall or tend downwards. In living beings it is the cause of stolidity. These three qualities are not mere accidents of nature, but are of its essence, and enter into its composition. We speak of the qualities of nature, as we do of the trees of a forest," says the Sanchyas.



many waters appear as a single thing, so by the application of the idea of generality to the unconscious things which are united with sentient souls and manifested by (the idea of) plurality, they appear as one single thing.

"Which is not produced, which is one" (ignorance, Maya,) says the Sruti.

In this universality (of unconsciousness) by being the attribute of the perfect one, is the principal quality, viz. that of goodness, prevailing; the soul in which this (universal unconsciousness) is inherent, and which has the attributes of omniscience, omnipotence, supreme government and other perfections, which is manifested by (the notions of) existence and non-existence, which is the all-pervading cause of the world, is Supreme ruler. His omniscience arises

र्देश्वरः from manifesting all that is without consciousness.

"Who knows all, is omniscient," says the Sruti.

This universality (of unconsciousness) is the causal organism (of the Causal organism. soul,) since it is the cause of the universe, it is the cause of blessedness, since it involves all bliss and has the quality of covering like a case; it is profound sleep, since it rests above all; it is therefore said to be the place of destruction of the subtile and gross expanses.

As by the application of (the idea of) speciality a forest is perceived as trees in the plural number, or water as many waters, so by the application of (the idea of) speciality the universal unconsciousness appears as many unconscious things.

"Bramha is by his Mayas manifold," says the Sruti.

In this instance by the application of universality and speciality arises the name of universality and speciality, (of unconsciousness.) This speciality of unconsciousness, by its being an attribute of the single soul, has the principal quality of goodness in its impure state. The soul, in which this (special unconsciousness) is inherent, and which has therefore the attributes of ignorance, subjection and other imperfections, is called the Individual Intelligence, individual intelligence; it has the attribute of partial knowledge, since it manifests only one

<sup>\*</sup> I have rendered the Sanscrit term: WIN: by individual intelligence. The adequate version would be: who knows only a little, which is, however, in fact the same with the idea of an individual intelligence.



unconscious thing; it is not able to manifest many, because it has the quality of indistinctness. Since it (the special unconsciousness) is the cause of selft, and of other similar attributes, it is the causal organism (of the soul) as it includes all bliss, the case of blessedness, as it rests above all, profound sleep, therefore the place of destruction of the subtile and coarse organisms. In that state the supreme ruler and the individual intelligences enjoy by the subtle powers of unconsciousness, which are the manifestations of the soul, (perfect) blessedness.

"The individual intelligence, which is the same with the soul, enjoys bliss," says the Sruti.

This is also confirmed by the fact, that one who awakes from sleep, makes the reflection,—Sleeping I was happy, I knew nothing.

There is no distinction between both the universality and speciality, (of unconsciousness) as there is none between forest and the trees, and water as one thing, and water as many waters. There is no distinction likewise between both, the supreme ruler and the individual intelligences, in which that universality and speciality are inherent, as there is none between the sky, which covers the forest and the trees, and between the sky which is reflected by the ocean and by many waters.

" That Ruler of all," says the Sruti.

As there is for both the forest and the trees, and the sky, which is attributed to them, as well as the water and the waters, and the sky, reflected by them, another not attributed sky, which is the location of them, so is for both, the unconsciousness and the soul, in which it (the unconsciousness) is inherent, another soul which is not inherent, and which is called the fourth.

"They call him blessed, tranquil, without duality, the fourth," says the Sruti.

This indistinctness is produced, according to the Tika, by the state in which the single soul is placed, viz., in which the first quality, being suppressed by the second and third qualities, cannot be clearly manifest.

<sup>†</sup> अहद्भार: Self, more properly what produces self, the notion of egoity, the faculty or power to refer all perceptions and notions to a self, an ego.

† This term of the fourth will afterwards be explained.

Védánta-Sara, or Essence of the Védánta. 1845.7 This fourth, the soul in its pure state\*, if, like a burning iron-ball,

not distinguished from the unconsciousness and the soul, in which it is inherent, is the literal meaning of the great sentence, (viz., that art thou; which the teacher first addresses to his pupil) if distinguished, it is the real meaning of the great sentence.

The unconsciousness possesses two powers, the covering and the il-Covering power of un- lusivet. The unconsciousness, though finite, hides consciousness. by its covering power the infinite, incorporeal soul,

अवरणश्राकः by obstructing the mind of the observer, in the same way, as even a small cloud covers the orb of the sun, which extends many miles, by obstructing the direction of the eye of the observer.

Thus it is said, "As an ignorant man, the eye of whom is covered by a cloud, thinks the sun to be covered by a cloud and without radiance, so the self as soul, which is infinite knowledge, appears before the eye of the ignorant as constrained in limits."

When the soul is covered by this power, then arises the impression of dominion, possession, happiness, misery and of other notions, connected with material things, as from a rope, which is not perceived to be a rope (which is covered by its own ignorance) the idea of a snake

Illusive power. is produced .- As the ignorance with regard to a विचेपशक्तिः rope, produces by its own power (the idea of) a snake and similar things upon a rope which is not perceived to be a rope (which is covered by its own ignorance) so shows the unconsciousness (ignorance) by its own power all the expanses of the universe upon the soul, which is covered by ignerance. This power is called the illusive power.

It is said, "The illusive power of ignorance creates the world from the internal organisms of Bramha's egg."

\* That is to say, considered in its absolute state, in which all differences and attributes are annihilated, and which can only be expressed by the notions of infinite existence and knowledge.

† There is this difference between the two powers, the one is negative, there is an absence of truth, because it is concealed; the second, however, is a creative power, it creates appearances, illusions which claim to be realities; the term illusive does not fully express the Sanscrit word, but I did not find a more adequate one.

The soul, in which the ignorance with its two powers is inherent, is by its own principality the instrumental cause (figurance) the material cause (guiria), as a spider by its own principality is the instrumental cause, and by the principality of its body the material cause of the web. From the soul, covered with unconsciousness, as illusive power, (the second power) in which the darkness (the third quality) prevails, is produced the ether, from the ether the wind, from the wind the fire, from the fire the water, from the water the earth.

"From this soul, in which unconsciousness is inherent, the ether is produced," says the Sruti. In the cause of them (the five elements,) darkness predominates on account of the prevalence of the inanimate in those elements; in that state are the three qualities, (truth, action and darkness) produced in the ether and the other elements according to the quality of their causes. Those subtile elements are called atoms (तरमार्च) and uncombined elements.

From them are produced the organisms and the gross elements. The subtile organisms are the seventeen organs, and the internal organisms. Those organs are the five intellectual senses, understanding and reason, the five organs of acting and the five internal airs. The intellectual senses are the ear, the sense of touch (skin,) the eyes the tongue and the nose. They are separately, according to their

Understanding. बृद्धिः Reason. सनः Thinking.

order, produced from the united parts of the first quality of those elements. Understanding is called the action of the mind, by which it asserts; reason that action of the mind, by which it doubts or decides; in both (actions) are thinking (चित्रं) and consciousness included; thinking is that action of the

There are three kinds of causes, . Samaváyikárana, the same which is here called **Surgis**, which signifies the elements, of which any substance may be produced, therefore material cause; 2. Asamaváyikárana, the actual union of the componing parts; 3. Nimitta Kárana, the instrument, by which an effect is produced; vide Bhasha Parichéda.

<sup>+</sup> AIAIM: is the first element, in which all others are comprehended; according to the Bhasha Parichéda it is everywhere, and has, with the exception of the sound, the same attributes with time. In want of a more appropriate term ether perhaps expresses best its meaning.



Consciousness. mind, by which it examines; consciousness, by which श्रहन्कारः it perceives its actions as its own actions. are also produced by the united first qualities of those elements, which is evident from the fact, that they have the power to manifest. The understanding together with the intellectual senses, forms the Intelligent case of the intelligent case of the soul; this (case) on account of its manifesting the impulses of dominion, soul. possession and pride, is called the administering sentient soul, the possessor of this and another world. The reason together with the organs of Mental case of the soul. action form the mental case. Organs of action are word, hand, foot, the organs of evacuation and generation. They are separately according to their order, produced by parts of the second quality. The vital airs are those of respiration, of inspiration, of circulation, the guttural air and the equalizing air, (of digestion.) The air of respiration (知识:) is going upwards through the nose, that of inspiration (त्रपाणः) going downwards to the lower extremity of the intestine, that of circulation is diffused throughout the whole body. The guttural wind (उदान:) moving upwards turns back again, and has its place in the throat. The equalizing air (समानः) passing through the middle of the body, equalizes the food, which is taken by eating or drinking; to equalize is to digest and to produce the different substances for assimilation or excretion. Others maintain five airs, different from those above mentioned, viz. of eructation, of winking, of digestion, of yawning and of nourishing. The air of eructation (नाग) produces belching, that of winking (क्रमः) effects the closing of the eyes, &c. that of digestion (क्कर:) produces hunger, that of yawning (इवदत्तः) produces yawning, that of nourishing (धनञ्ज्यः) makes the body stout. Others assert, that the latter five airs are included in the former classes. The five vital airs are produced by the united second qualities of the five elements, and Vital case. form together with the acting organs the vital case; it is produced by parts of the second qualities, because it is living action. Among those cases the intelligent case, having the faculty of

Among those cases the intelligent case, having the faculty of knowledge, is the ruling, the mental case, having the faculty of desire, is the causal, and the vital case, having the faculty of action, is the performer of works. The divisions of the cases are made according to

their fitness (for certain actions.) They are called, when united, the subtile organism of the soul. Here also becomes the whole subtile organism by being the object of One mind, universal organism like the forests and the sea, and by being the object of many minds, special organisms, like the trees and the waters. The soul, in which the

the cause of himself, the sentient (conscious) being, because all things are arranged in him, and because the powers of knowledge and of action are inherent in him. The universality of this is the subtile organism (of the soul,) because it is subtler than the gross organism. The threefold case, having the desire of awaking, is dream, and therefore called the place of destruction of the gross organism.—Taijasa the soul, in which the speciality of this threefold organism is inherent, is called the manifesting mind. The speciality of this is the subtile organism from its being subtler than the gross organism. This threefold case having the desire of awaking, is dream, and therefore called the place of destruction of the gross organism. Both Shútráta and Taijasa perceive in that state the subtile objects by the subtile powers of the mind.

"Taijasa, the subtle possessor," says the Sruti.

In that state there is no difference between Shutrata and Taijasa, in which the universality and speciality are inherent, as there is none between the sky which covers the forest and the trees, or the sky which is reflected by the sea and many waters. Thus is the production of the subtile organism.

The gross elements are composed of the subtle ones according to the

Production of the gross elements, combination of five.

पञ्चीकृत

combination of five. The combination of five is to divide each of the five elements into two parts, then equally to divide each of the five former of the ten parts into four parts, to separate these four

of the one half from their own parts, and to join them with the parts of the other elements. The combination of five is proved beyond doubt by the Sruti, in which a combination of three of the same kind occurs. Though the elements are equalized with each other (containing a fourth part of their former halves) yet it is proper to call them by their own name, according to the greater proportion of one element (in that combination.)



In that state sound is manifested in the ether, sound and feeling in the wind, sound, feeling and colour in the fire, these three with taste in the water, and these four with smell in the earth.

From these five elements, combined in the said manner, were produced the different Upper Lókas\* (worlds) viz., Bhur-lóka, Bhuvar-lóka, Swar-lóka, Mahar-lóka, Janar-lóka, Tapar-lóka and Satya-lóka, which are placed above the others, then the Nether-lokas,† viz., Atala, Bitala, Sutala, Rasatala, Talátala, Mahátala and Patála, which are placed one beneath the other, farther Bramha's mundane egg, the gross organisms in their fourfold division, contained in that egg, and food, water and other substances.

Bodies (organic) are either produced from the womb, or from eggs, or from damp, or from germs. Those produced from the womb are born alive, as men, animals, &c.; from eggs come forth from an egg, as birds, serpents, &c.; produced from the damp are worms, insects, &c.; which are born from hot moisture, produced from germs are those which emerge from the earth, as creepers, trees, &c.

Here also is the gross organism in its fourfold division, by being the object of one or many minds either a totality, like the forest or the ocean, or separated into a plurality of bodies, like the trees and waters. The soul in which this totality is inherent, is called Vaishwanara, Viraj, on account of its knowing itself as the totality of men, and of its governing the universe. This gross body is here

enumerated, or heaven, hell and earth; another classification enumerates seven, exclusive of the infernal regions, or Bhurlóka, the earth, Bhuvar-lóka, the space between the earth and the sun, the region of the Munis, Siddhis, &c. Sver-lóka the heaven of Indra, between the sun and the polar-star. Mahar-lóka, the usual abode of Bhrigu and other saints, who are supposed to be co-existent with Brahma. During the conflagration of the lower worlds, the saints ascend to the next, or Janalóka, which is described as the abode of Bramha's sons, Sanaca, Sananda, Sanatana and Sanatacumara; above this is the fifth world, or the Tapar-lóka, where the deities, called Vairagis reside; the seventh world, Satya-lóka, or Bramha-lóka is the abode of Bramha, and translation to this world exempts beings from farther birth; the three-first world are destroyed at the end of each calpa or day of Bramha; the three last at the end of his life, or 100 of his years; the fourth Lóca is equally permanent, but it is uninhabitable from heat at the time the three first are burning. Wils, Sansc. Dict.

<sup>†</sup> Internal regions, in which various evil beings have their abodes.



the universal gross body of the soul, and because it is subject to change from nutriment, it is called the nutritious case of the soul; it is called awake, because it is the place in which the gross organisms are enjoyed.

The soul in which the speciality of this gross organism in its fourfold division is inherent, is called Bishwa, (which enters into all) because, not leaving the subtler body it enters into the gross body. The gross body of the soul as speciality, because it is subject to change from nutriment, is called the nutritious case of the soul, it is called awake, because it is the place in which the gross things are enjoyed. In that state perceive both Biswa and Baishanara (the universal soul and the single soul, in which the gross organism is inherent) by their five intellectual organs, which are respectively ruled by the quarters of the world, the winds, the sun, Varuna (god of waters) and the Aswis (Gemini) sound, feeling, colour, taste and smell, by their organs of action, which are respectively ruled by the fire, Indra, Upendra, (form of Vishnu) Jama, (death) Prajápati, (Bramha as creator) they possess the power of speech, taking, going, evacuating, generating, and by the internal four organs, understanding, reason, consciousness and thinking, which are respectively ruled by Chandra (moon) Chaturmukha, (the fourfaced, a form of Bramha) Chankara, (a form of Shiva) Achyuta, (Srikrishna) they possess the power of asserting, deciding, consciousness and thinking, that is to say, they possess all the objects of the gross organism.

"In the state of awaking knows the soul the external objects," says

In that state there is also no difference between Bishwa and Baishánara, in whom the universality and speciality of the gross organism are inherent, as there is none between the sky, which is covered by the forest, and the trees, or between the sky, which is reflected by the sea, and by many waters. Thus is the production of the universe of the gross organism from the five elements, in the combination of five. The universality of the expanses of the gross, subtle and causal bodies is one great expanse, as the universality of inner forests becomes one great forest, or as the universality of inner oceans one great ocean. The soul, in which this is inherent, from Bishva and Baishanara to the Supreme Ruler is one soul, like



the sky, covered by inner forests, or like the sky, reflected by the inner oceans. The uninherent soul, when like a burning iron-ball, not separated from both, the great expanse and the soul, in which the former is inherent, is the literal meaning of the great sentence: all this is in truth Bramha; when separated, it is the real meaning. Thus is the improper transferring of an unreal thing upon the real thing generally explained.

The various modes of placing this and this, or that and that,

Various modes of upon the all-pervading soul, will now be speci
transferring. fied.

A very common man, because the Sruti says, "The soul is born as a son," because he loves his son as himself, and because, when his son is in good or bad circumstances, he thinks himself so, asserts, that the son is the soul. A Chárváka\*, because the Sruti says, "This soul is a body of blood and flesh, because he leaves his own son in a burning house to save himself, and because he thinks, I am stout, I am thin, asserts, that the gross body is the soul." Another Chárváka, because the Sruti says, "The sentient souls, repairing to the Lord of creation, addressed him thus," because there is a want of bodily motion, when there is a want of the intellectual organs, and because he thinks, I am blind, I am deaf, asserts, that the intellectual organs are the soul. Another Chárváka, because the Sruti says, "The other internal soul is vital," because there is a want of action of the intellectual senses, when the vital airs are wanting, and because he thinks, I am hungry, I am thirsty, asserts, that the vital airs are the soul. Another Chárváka, because the Sruti says, "The other internal soul is reason," because there is a want of the action of the vital airs, &c., when the mind sleeps, and because he thinks, I assent, I doubt, asserts, that the reason is the soul. A Bauddha, + because

<sup>•</sup> Colebrooke, R. A. Trans. vol. i. p. 597, says of the sect of the Charvacas, that they restrict to perception only the means of proof and sources of knowledge, that besides the four elements, earth, water, fire and wind, they acknowledge no other principles, that the soul is not different from the body.

<sup>†</sup> Col. Miscell. Essays, vol. i. p. 396. The Bauddhas or Saugatas are followers of Buddha or Sugata. No less than four sects have arisen among the followers of Buddha. Some maintain, that all is void. To those the designation of Madhyamica is asserted by several of the commentators of the Védanta. Other disciples of Buddha...maintain the existence of conscious sense alone. These are called

the Sruti says, "Another internal soul is knowledge," because there is no action of the organs, when there is no ruler (first mover,) and because he thinks, I am enjoying, asserts, that the understanding is the soul. Prábhákaras and logicians, because the Sruti says, "another internal soul is pleasure, because it is evident, that ignorance destroys the understanding, and because they think, we are ignorant, we know, assert, that ignorance is the soul.

The followers of Bhatta, because the Sruti says, "The soul is knowledge as pleasure," because in deep sleep manifestation and also non-manifestation take place, and because they think, we do not know ourselves, assert, that the soul, in which unconsciousness is inherent, is the soul.

Another Baudha, because the Sruti says, "This (universe) was before (the creation) nothing," because in deep sleep there remains nothing, and because he who awakes, naturally thinks, I did not exist in deep sleep, asserts, that the soul is nothing.

In all those assertions, commencing with the son and terminating with the nothing, (void) the soul is asserted to be what really is not the soul. As the apparent arguments from the Sruti, inference and observation, which commence from the common assertion of the son, clearly show, that one argument from the Sruti, inference and observation is refuted by arguments of the same kind, it is evident, that the soul is not the son, &c. That the soul is not mind, not a first mover, that it is mere knowledge, mere existence, follows from the contradiction of a much more powerful Sruti, it follows from the reason, that all those inanimate principles from the son up to the void, by having their existence only through the manifestation of the soul, are transient like all material beings, and also, that there is much greater authority in the thought of the wise: I am Bramha. It is therefore evident from the contradiction of these arguments from the Sruti, inference and observation, that none of these principles is the soul. Therefore the eternal, pure, omniscient, free, true, self-existent (or

Jógacharas. Others, again, affirm the actual existence of external objects no less than internal sensations. Some of them recognise the immediate perception of interior objects. Others contend for a mediate apprehension of them. Hence two branches of the sect of Buddha, one denominated Sautrantica, the other Vaibhashica.

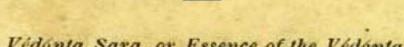
whose nature is true) all pervading Chaitanya, which manifests all those principles, is the supreme soul, this is the opinion of those that know the Védanta. Thus the improper transferring.

Abstraction (अपवादः) is called the action, by which the real thing is acknowledged as the only real thing, after the expanse of the unreal things which commence from the unconsciousness, has been removed from it, as a rope is acknowledged to be a mere rope, when the (notion of the) serpent has been removed from it. In this manner has the place of fruition, viz., the gross body in its fourfold division, the substances which are fit to be enjoyed, as drinking, food, &c., in this manner the place of their support, the earth and the other fourteen worlds, in this manner Bramha's egg (the universe) all this has its existence alone in the gross elements in the combination of five, which are the cause of them. The elements in the combination of five together with the sound and other objects of the gross bodies, all this has its existence alone in the uncombined elements, which are the cause of them. The uncombined five elements together with the three qualities (truth, action and darkness ) all this has its existence alone in the soul, in which unconsciousness as its cause, is inherent, further, this unconsciousness and the soul, in which it is inherent and which has the predicates of supreme lord, &c, is merely the fourth Bramha, the uninherent soul, which is the place of support for them.

The sentence, that\* art thou, + becomes by means of both, the improper transferring and abstraction explained in its full meaning; 1, the universality of ignorance and what is connected with it; 2, the soul in which it is inherent and which has the predicates of omniscience, &c.; and 3, the uninherent soul, these three are, like a burning iron-ball, when perceived as one, the literal meaning of the term that; the uninherent soul, being the place of support, in which the properties of that (universality) are inherent, is the designable (real) meaning of the term, that. These three—1, the speciality of ignorance; 2, the soul, in which it inheres; and which has the quality of ignorance and other imperfections, and 3, the soul in which this is not inherent, these three like a burning iron-ball, when perceived as

<sup>.</sup> The universal soul.

<sup>†</sup> Any individual intelligence.



one, are the literal meaning of the term, thou; the all-pervading blessed, fourth, supreme soul, being the place of support, in which the properties of that (speciality) are inherent, is the designable (real) meaning of the term, thou.

- III. Connexion.—The meaning of the great sentence will now be explained. The sentence: that art thou, explains the true signification of the infinite Bramha by the three categories of relation. The three categories are: 1, the relation of what is identical in these two terms; 2, the relation of what is distinguishable and distinguishing (subject and predicate) in the meaning of them; 3, the relation of what is designable and what is designing in the meaning of those terms, viz. the universal and the single soul; for it is said, "that the identification, the fixing of what is distinguishable and distinguishing, and the relation between what is designable and designing explain the meaning of the terms of the single and universal soul."
- 1. The category of identification; as in the sentence, that is this Dévadatta, the term that, which refers to Dévadatta, as being in a past time, and the term this, which refers to Dévadatta, as being in the present time, (both terms) design the connexion in one and the same place; thus also in the great sentence, "that art thou," both terms, viz. the term of that, which means the soul, as having the attributes of invisibility, &c. and the term of thou, which means the soul, as having the attributes of visibility, &c., design the connexion in one and the same soul.
- 2. The category of what is distinguishable and what is distinguishing (subject and predicate); •as in the former sentence, (that is this Dévadatta) the meaning of the term that, which refers to Dévadatta, as being in a past time, and the term this, which refers to Dévadatta, as being in the present time, both come into the relation of what is distinguishable and distinguishing by the annihilation of their mutual differences; thus also in the great sentence both terms, viz. the term that, which means the soul, as having the attributes of invisibility, &c., and the term thou, which means the soul, as having the attributes of visibility, &c. come into the relation of what is distinguishable and distinguishing by annihilation of their mutual differences.
- 3. The category of what is designable and what is designing, as in the same sentence, (that is this Dévadatta) the relation of the design-

able and the designing refers simply to Dévadatta, in which there is no contradiction, after the contradictory terms of that and this or their corresponding meanings, being in the past and in the present time, have been dispensed with; thus also in the great sentence the relation of the designable and the designing, refers simply to the soul, in which there is no contradiction, after the contradictory terms that and thou, or their corresponding meanings, viz. having the attributes of invisibility and visibility, have been dispensed with.

This category is called the partial designation. In the great sentence the meaning is not consistent,\* as it is in the literal meaning of the sentence—the lotus is blue. In this case, as in the term blue, the quality of blue, and in the term lotus, the thing lotus, exclude other qualities and things, as for instance white, and cloth; and as the unity of the mutual connexion of predicate and subject, or the unity of the one, determined by the other, are in correspondence with each other, because there is no contradiction from another argument, (in this case) the meaning of the sentence is consistent; but if you think that, in the great sentence, by excluding the mutual differences of the term that, which means the invisible Chaitanya (soul,) and of the term thou, which means the visible Chaitanya, the meaning of the sentence does agree, viz the connexion between predicate and subject, or of the unity of the one, determined by the other, we must maintain, that the meaning of the sentence is not consistent, because it involves the contradiction of the invisibility, &c. Nor is here an omitting designation (ellipsis,) as in the sentence-on the Ganga lives the herdsman, consistent. As there is in this case a perfect contradiction in the meaning of the sentence, which expresses a connexion between the support, and what is to be supported, viz. the Ganga and the herdsman, the ellipsis is called for, because there is a propriety in the designation of the bank of the Ganga, by entirely dispensing with the meaning of the sentence. In the great sentence, however, as there is no contradiction in one part alone of the meaning which shows the unity of the invisible and visible Chaitanya, the ellipsis cannot take place, because another ellipsis would be improper without also dispensing with the other

The author, after having discussed the three categories of relation, refutes three other forms of relation, which at the first glance may appear to express the meaning of the great sentence.

part. If you say, as the term Ganga, by entirely rejecting its own meaning, points to the term bank; so also the terms that and thou by entirely rejecting their literal meaning, point to the terms, thou and that; why then should the ellipsis be inadmissible: then we must say, you are not right, because in the former sentence, if you did not mention the term of bank, its meaning was not known, which therefore required such an ellipsis; but in the latter sentence, by mentioning the terms that and thou, their meanings are fully known, and consequently there is here no necessity of knowing the meaning of one word by another through the mentioned ellipsis.

Nor is here the case of the not omitting designation admissible, as in the sentence-red runs. The sentence, which speaks of the moving of a quality, is contradictory; but here by not omitting it in the ellipsis of a horse, which is the place of this or other qualities, the contradiction is removed, and the not omitting designation is proper; but in the great sentence, on account of the contradiction in the meaning, which points out the unity of the invisible and visible Chaitanya, if you, not dispensing with the invisibility and visibility, refer through the said ellipsis to any other terms, the contradiction is not removed, and therefore this ellipsis cannot take place. But if you say, that the terms that and thou, by rejecting the contradictory part of their own meanings, point to the terms that and thou, as united with the other part, and if you continue, why then do you not grant a partial ellipsis by another means? We must say, that this is not proper, because it is impossible to grant an ellipsis for both, viz., for a part of its own meaning and for another term by a single term; and also because the meaning of the terms being known, there is no necessity to know them by an ellipsis.

As therefore the sentence, this is that Dévadatta, or its meaning on account of the contradiction in a part of its meaning, which refers to Dévadatta, as being in the present and in the past time, by omitting the part which refers to the contradictory terms, being in the present and in the past time, the not contradictory part only, viz. Dévadatta, remains; so in the great sentence, that art thou, or the meaning of it, on account of the contradiction in a part of its meaning, which

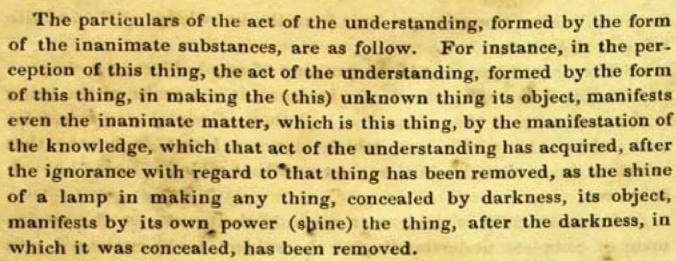
<sup>\*</sup> This term means, that a word retains its literal meaning, while at the same time it points to a term, which is not included in it.

refers to the invisible and visible Chaitanya, by omitting the part which refers to the contradictory terms, having the attributes of invisibility and visibility, refers to the not contradictory part only, viz. Chaitanya (soul.)

The meaning of the great sentence, I am Bramha, which was received by internal perception, will now be given.

When the teacher has thus, by means of the improper transferring and of the true abstraction, purified the two terms, that and thou, and the meaning of the infinite one has been explained by the great sentence, then is produced in the mind of the qualified person the act of the understanding, formed by the form of the infinite Bramha, viz., I am the eternal, pure, omniscient, free, true, self-existent, ever blessed, infinite Bramha, without duality. This act (of the understanding,) together with the (adequate) likeness of the omniscient being, by making the all-pervading, undivided, unknown, supreme Bramha its object, destroys the ignorance with regard to him.

Then as cloth is burned by the burning of the thread, which is the cause of it; so by the destruction of the ignorance, which is the cause of the whole creation, the act of the understanding, formed by the form of the infinite substance, is also destroyed, as included in that creation. As the shine of a lamp is absorbed by the overpowering rays of the sun; so the soul, which is reflected by that act of the understanding, and absorbed by the self-manifesting, all pervading, undivided, supreme Bramha, which it (the understanding) is unable to manifest, (the soul) becomes, since the act of the understanding, which is a part of his qualities, is destroyed, the all pervading, undivided Bramha, as the face only remains, when the looking-glass, in which it was reflected, has been removed. If this is true, the contradictory statement of the two passages of the Sruti, viz., "by the mind it must be comprehended," and "what is not perceived by the mind, is reconciled," because by granting, that the act of the understanding makes Bramha its object, the effect (the manifestation) must be at the same time prohibited. It is also said, to make (Bramha) object of manifestation, is prohibited by the authors of the Shastras. For the destruction of the ignorance respecting Bramha, that act of the understanding is required, and it is not proper that he who manifests himself, is manifested by another.



IV. The four means.—The diligent application of the four acts, viz. hearing, attention, of contemplation and meditation, being required, until the perception of the soul, which has no other likeness but with itself, is obtained, they must be here described.

1.—Hearing means the fixing of the opinion of the Védántas with regard to the being without duality, by the six modes of determination, which are, the commencement and the end, the practice, the exclusion of other arguments, the final end, the proper speaking, and the demonstration.

a. The commencement and the end is the fixing of any subject, to be explained in a chapter (of the Védánta) in its commencement and end; for instance, in the sixth chapter of the Chandógya Upanishad, the definition of the being without duality, which is to be explained in that chapter, is in the commencement, one even without duality, and in the end, that Bramha, the life of the whole universe.

b. Practice is repeatedly to mention a subject in a chapter, in which it is to be explained; as for instance, in the middle of that chapter (Chandógya) the nine times mentioning of the being without duality by the great sentence, that art thou.

c. The exclusion of other arguments is not to demonstrate a subject, to be explained in a chapter, by other proofs, as in that chapter the being without duality is not demonstrated by another proof.

d. Final end is the fruit from the knowledge of Bramha, to be explained in a chapter, or from the practice of that knowledge, as it is mentioned in that chapter, "that the man who has a teacher, knows that he belongs to him, until he is liberated; then he will



be saved." Thus the principal fruit from the knowledge of the infinite being is to gain that end.

- e. The proper speaking is the praising of any subject in a chapter, in which it is to be explained; for instance, it is a praise of the being without duality in that chapter. "O thou (disciple) you asked for such advice, by which that which is never heard, is heard; that which is never thought, is thought; and that which is never known, is known.
- f. Demonstration is the proper mode of deduction for the attainment of complete understanding of the subject, to be explained in a chapter; as for instance, in that chapter, "O thou handsome youth, as all things, made of earth, are known by one clod of earth, the difference consists in words only; the real thing is earth, so the demonstration in that chapter is the proper mode of deduction in the attainment of the complete understanding of the being without duality, that there is no difference but in words."
- 2.—Attention is the constant attending to the being without duality, by those demonstrations, which refer to it in the Védánta.
- 3.—Contemplation is the remaining of the same state of the understanding, formed by the form of the being without duality, with regard to that being, which is not believed to exist in the transient form of a body.
- 4.—Meditation is twofold; the one in the form of difference, the other without it. Meditation, which has the form of difference, is to place upon the being without duality the act of the mind, formed by the form of it (that being) without removing the difference between him who knows, the object of knowledge, and knowledge itself. As in the perception of an earthen elephant, earth only is actually perceived; so the being without duality is perceived even in the perception of duality. Thus it is said by philosophers, who maintain, the being, which is like the eye, which is (the support of all) like the ether, which is supreme, which is at once manifest, which is not produced, which is one (without difference in itself and from others) imperishable, in which all differences are annihilated, which is omnipresent and without duality, even this being am I, who is for ever liberated. I am perfect in knowledge, pure, unchangeable; I am not fettered, I do not require salvation.

The meditation without difference is to place upon the being without duality the same act of the understanding, formed by the form of it (that being) after having removed the differences between him who knows, the object of knowledge, and knowledge itself. As water alone appears by the disappearance of salt, which is formed by the form of water; so appears the being without duality alone by the disappearance of the act of the mind, formed by the form of that being. Still it must not be thought, that there is no distinction between this state and sound sleep: for though in either the same absence of the act of the understanding does occur, yet, from the existence and not existence of that act in either state, the distinction between them is evident. This meditation includes: refraining, religious refraining, sitting in a peculiar posture, suppression of breath, coercion, internal fixing and meditation.

Refraining includes the following acts: refraining from injury, regard for truth, abstaining from stealing, obedience to the spiritual teacher, and not accepting (gifts.)

Religious refraining includes purification, contentment, devotion, reading (of the Védas) and meditation on the Supreme Ruler.

Sitting in a peculiar posture are the different modes of placing the members of the body in a prescribed form, as in the form of a lotus, &c.

Suppression of the breath is the peculiar mode of expiration and inspiration, and of keeping the breath.

Coercion is the refraining of the senses from their objects.

Internal fixing is to fix without intermission the acts of the internal senses upon that being.

Meditation, is here the first one, which has the difference in itself.

There are four obstacles to the perfect meditation without difference: viz. listlessness, absence of mind, passion, and propensity to pleasure.

Listlessness is the sleep of the mind, (caused) by not attending to the being without duality.

Absence of mind is attention to other things by not attending to the being without duality.

Passion is inadvertence to the being without duality, not from listlessness, or absence of mind, but from the act of the understanding, being fettered by the desire of love, or other passions.



Propensity to pleasure is, to enjoy by the act of the mind, no being directed to the being without duality, the pleasure, produced by the meditation, which has its difference in itself, or the enjoyment of pleasure, produced by that meditation at its commencement. When the understanding, free from those four obstacles and immovable like a lamp, protected from the wind, thus becomes the infinite Chaitanya alone, then the meditation is called that without difference. It is said, he will awaken the understanding, sunk in list-lessness; he will concentrate it, when lost in absence of mind; he will enlighten it, when blinded by passion; he will not move it, when steadied by austerities; he will not let it taste pleasure; by the consideration (of universal things) it will be without fondness. As a lamp, protected from the wind, &c. &c.

Definition of the living free. The living free is the Bramhanishta (devoted to Bramha) who, after the infinite, self-like Bramha is known, when the ignorance with regard to him is removed by the knowledge of the self-like, infinite, pure Bramha, is free from all worldly fetters, by the destruction of the ignorance and its creation, of the unrewarded works (those works which have not borne their fruit previously to the true knowledge) of doubt, (viz. whether there is a soul different from the body or not) and of other misapprehensions. "When he, the universal soul, has been perceived, then all the conscious acts of the understanding are extinguished, then all doubts are removed, and also his works are annihilated," says the Sruti.

Though he in the time of awaking (the Bramhanishta) by his body, which is like a vessel of flesh, blood, &c., by his senses, which are like vessels of blindness, bluntless and unfitness, and by his mind, which is the vessel for the sensations of hunger, thirst, grief and error, performs the works which are worked by the impulses of his former desires, and enjoys the fruits of his undertakings, which (the fruits) are no obstacles to the true knowledge; still he does not actually perform or enjoy them, since he has destroyed the whole creation of ignorance, as a person, who knows a thing, which he perceives to be an illusion of his senses, does not actually believe in its reality, though he may perceive it. "As one seeing does not see, or hearing does not hear," says the Sruti. It is also said, who in a waking state is like a person fast asleep, who does not perceive, though perceiving, duality, because he is



above duality, who, though acting, does not act, he knows the soul none else; this is certain. As previously to the obtainment of this knowledge he followed the sensations of hunger and other appetites, so he (now) follows (only) the impulses to good works, or there is the same indifference to good and evil actions. It is said, "If he, who knows the reality of the being without duality, can act according to his desire, what difference is then between a dog and him who knows the truth, as regards the taking of impure food. He knows the soul, who has purified the knowledge of Bramha (from ignorance) not another, must be the answer. Humility of mind, the cause of true knowledge, benevolence and other virtues will adorn him like ornaments (in that state.) It is said, he who has gained perfect knowledge of the soul, possesses benevolence and other virtues, without effort on his part; but not he (possesses them without effort) who is striving for the means of salvation. What else can I say? He, who for the maintenance of his body only suffers the happiness and misery, resulting from his works, which are done to accomplish his own desires and aversions, as well as those of others, and brings to light the impulses of his mind, will on the approach of death unite his life with the all-pervading, ever blessed, supreme Bramha; and having thus destroyed the perception of ignorance and of its creation, he will exist as the supreme Bramha, who is perfect salvation, the fountain of all bliss, and free from the signs of every difference. His life is not taken to other places, but to him (Bramha) it is flowing. Free, he is made free; thus says the Sruti.

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Note of the Course of Study pursued by Students in the Sanskrit College, Calcutta. By W. Seton Karr, Esq., B. C. S.

The course of study pursued by the students of the Sanskrit College is as follows: they begin by studying Vyakaranam, or grammar, for the first three years. The grammar mostly used is one called the Mugda Bodha, written in Sanskrit, as those written in Bengali are despised by the Natives. It is a peculiarly native idea, that until a thorough acquaintance with the rules of grammar, as seen theoretically, is obtained, nothing can be done towards acquiring the language by reading other books; no attempt is therefore made to combine the learning of the rules of grammar with the reading of the Hitopadesa or other books of an easy style. When, however, they have acquired such a thorough knowledge of grammar as to be able to repeat whole pages of it by heart, they plunge at once into some of the hardest books of the language; the next two years succeeding the three spent on grammar are devoted to reading the following works: the Bhatti Kavya, or poem of Bhatti, a work made principally to aid the acquisition of grammar, every line being an illustration of some particular rule; the Raghu Vansa, the Kumara Sambhava, Naishadha, Sisupalabadha, Sacontala, Veai Sanghara, Murari, Bharovi, Prasanna Raghava, Ultara Rama Charitra, Raghava Pandavi, Vasavadatta. Several of the above works are known by the name of "Mahakavya, or great poems," a title applied to only six works; those of the above which lay claim to it are the Raghuvansa, Kumara Sambhava, Sisupalabadha, and Naishadha. The next year is devoted to Alankara, or rhetoric during which the following works are read: Sahitiva Darpanam, Kavyo Prakasha, and Chando Mangari,-all these they learn off by heart.

The next year is devoted to the Vedantas, or works of later writers, illustrating the scope and objects of several passages in the Upanishads of the Vedas, relating to an abstract and speculative monotheism. The works read are the Vedanta Sara, Panchdasti, and Sharirika-shutra.

The next year is devoted to Nyaya, or logic. Works read, Bhashaparicheda (the division of language) and the Gautama-sutra.

The next year is devoted to mathematics. Books, the Lilavati and Bijganita.



The next three years are devoted to Smriti, or law. The books read are Manu, the Mitakshara, Daibhaga, Dattika Mimansa, Dattaka Chandrika, Udraha-tattiva, Shuddhi-tattiva, Dayakrama, Sangraha, and Dhaiva-tattiva. The whole of these last, with the exception of Manu are committed to memory; besides this they are in the habit of learning by heart the greater part of a dictionary, called the Amarakosha (immortal treasure,) which contains the various synonyms of nouns current in the Sanskrit language, which, with regard to remarkable objects, as the sun, the ocean, Brahma, Vishnu, Shiva, a lotus, a serpent, &c. &c. are unusually numerous.

No student can be received after fourteen years of age in the Sanskrit College, and the whole time of study spent there is twelve years!

There are also a number of verses or slokas handed down traditionally from father to son, generally expressive of some pithy sentiment. It is pretty certain that they are not to be found in any book; of these, five hundred were known by one individual. Many of the Pandits during the whole of the above course of study have never read the Hetopadesa, one of the most curious books in the language, as being the only one written in prose; all the immense ocean of Sanskrit literature is in verse-even an unprinted novel, containing the history of an heavenly Apsara, who loved a prince named Chandrapiri, is in verse: the love of the Apsara reminds us of that of Aurora to Tithonus, or Venus to Anchises. The ponderous tomes of the Mahabharata are often totally neglected by the Pandits, although that poem is called the " fifth Veda," from its sacred character and great antiquity. This poem and that of the Ramayana, which Sir William Jones termed the two epic poems of the Hindus, are thus quite cast out of the circle of the Sanskrit College reading.

As Sanskrit scholars in Europe might feel interest in the above abstract, I publish it as communicated by a member of our Society, W. Seton Karr, Esq. C. S., who originally suggested to me the obtaining a statement of the sort for the Journal.



Memorandum on the Ancient bed of the River Soane and Site of Palibothra. By E. C. RAVENSHAW, Esq., B. C. S., with a Coloured Map.

One of the chief difficulties in identifying Patna as the site of Patalipootra, the capital of Chundragupta, has been the distance which at present exists between the river Soane and the city of Patna. Any satisfactory evidence, therefore, which can be brought to establish the fact that the confluence of the Soane and Ganges in former days took place in the vicinity of Patna, is of importance both in a geographical and historical point of view. Major Rennell, in his "Memoir of a map of Hindoostan," (page 50,) observes, that "Late enquiries made on the spot (about 1787 A. D.) kave brought out this interesting discovery, that a very large city which anciently stood on, or very near, the site of Patna, was named Patelpoother (or Pataliputra according to Sir W. Jones,) and that the river Soane, whose confluence with the Ganges is now at Moneah (Muneer), 22\* miles above Patna, once joined it under the walls of Patelpoother. This name agrees so well with Palibothra, and the intelligence altogether furnishes such positive kind of proof, that my former conjecture respecting Conoge must fall to the ground." In page 53, he adds, that "The ancient bed of the Soane is yet traceable on the south of Patna, and seems to have led into the Ganges near Futwah."

On accidentally meeting with the above passages in Major Rennell's work, at the time that the Professional Survey of the Patna district was going forward, I requested Lieutenant Maxwell of the Bengal Artillery (the officer in charge of the survey) to endeavour, if possible, to trace out the course of the old bed of the Soane, with a view either to verify or disprove the correctness of Major Rennell's information. Lieutenant Maxwell entered into the enquiry with his usual zeal, and with no other hints than what are contained in the above quotations, was successful in clearly tracing the old bed from a point on the Soane, near Sydabad (about 18 miles above Muneer) vià Bikrum, Nowbutpoor, Phoolwaree, Meethépoor to Bâkipoort, where it appears to have

<sup>\*</sup> It is now only 12 miles above the Golah, and 17 above the Western Gate of the old Fort of Patna.

t Called by European Residents, Bankipoor.

joined the Ganges about 200 yards west from the Golah, and nearly opposite the point where the Gunduck falls into the Ganges from the north. I forwarded the sketch map, prepared by Lieutenant Maxwell, to Mr. J. B. Elliott, late of the Civil service, the oldest European resident at Patna, who informed me in reply, that some years ago he had been led, by the perusal of the Drama called "Mudra Rakshasha," to make similar enquiries from the natives of the place. The following is a translation of the result of his enquiries, which corresponds very remarkably with the scientific survey: "Formerly the course of the Sone turned eastward from near Sydabad, whence it proceeded by Ghorhutta and Bikrum to Nowbutpoor, thence via Moorgheea Chuch Mooradpoor, Danapoor, Ghosunda, Koorjee, and Khugwul to Phoolwaree. From the latter town it flowed past Khwajapoora, Sheikhpoora, and Dhukunpoora to Meethapoor; whence in two streams (Jurrah) it fell into the Ganges near Bakipoor at the Tukeea of Shah Rookun Phulwan. From Phoolwaree a small stream (Sotah) flowed to the eastward, and from opposite Meethapoor, proceeding in a south-easterly direction, it finally united with the Ganges near Futtooha, (Futwa). In the time of Mukhdoom Shah Shuruf Ooddeen Ahmud Yaheea Munéree, (from which a period of upwards of 470 years reckoning to the end of 1251 Hijiree has elapsed,) the main stream of the Sone, taking its course west of the town of Muneer, united with the Ganges near that place, and the eastern course with the Sota became dry."

Lieutenant Maxwell in his first survey was unable to find any trace of the river south of Patna, but the information contained in the above statement regarding the branching off of a Sota, or small stream, from Phoolwaree, enabled him to discover and to follow the bed of the stream to the south of the city by Khémee Chuck and Mirchee, and its exit into the Ganges through the arch of an old bridge, about 3½ miles above Futwa.

The accompanying reduced map on a scale of four miles to the inch, prepared by Lieutenant Maxwell, will I hope be thought satisfactory as being the first ever published, which clearly defines the ancient course of the Soane. After receiving this map I met with the following passage in Buchanan (page 11, volume I, Mr. Martin's edition,) which was written about twenty-three years after Rennell's remark



above quoted. "The Son, according to the Bengal atlas, formerly joined the Ganges at Mănér, but a tongue of land has been formed projecting east from the Shahabad district, so that Mănér is now three miles at least above the junction of the two rivers. The Son receives no branch during its course in these districts, but sends off some old channels that in different places are called by its name. The chief of these separates from the river 11 or 12 miles above Mănér, runs straight east to the thanah of Vikram, and then bends north until it passes Noubutpoor. Immediately beyond this it sends to the right a branch\*, which, running through the whole breadth of the division of Bakipoor, joins the dry channel of the Ganges, and is called Mohauleya. The main channel of the Măr-Sôn+, soon after the separation of the Mohauleya, divides into two branches, which re-unite before they fall into the Ganges at Danapurt. That to the west is called Deonar, that to the east Bhadaiya. It must, however, be observed that an old channel may be traced running from this Măr-Sôn, and parallel to the Ganges, a great part of the way to Bâkipur, near the western extremity of the Patna city, and this may have been the old channel of the Sôn; and Patna may, therefore, have been once at the junction of this river with the Ganges."

This account, though differing in some particulars from that of the survey, agrees generally as to the fact of the confluence of the two rivers having been at Båkipoor near Patna; and this fact corroborated by so many separate investigations made at different times, by different individuals, may therefore be considered as fully established. The alteration in the course of the Soane is supposed to have taken place in the time of Shah Shuruf Oodeen Ahmud Ehya Muneeree, 781 Hijeree, corresponding with 1379 A. D. The following extracts, from the Memoirs of the Emperor Baber, proves that in the time of that monarch the Soane flowed by Muneer in 1529 A. D., and so far corroborates the tradition of its havin changed its course about the end of the fourteenth century. The "Ludra Rakshasa" shows that the

<sup>\*</sup> Buchanan seems here to have been misinformed, and to have alluded to the branch which separates at Phoolwaree, instead of at Noubutpoor.

t " Mar," means dead or dry Soane.

<sup>#</sup> Dinapoor.

<sup>§</sup> Page 412, Erskine's Translation.

change had not taken place when that play was written in about the eleventh century. "As they informed me that the Sôn was near at hand, we rode to see it. In the course taken by the river Sôn below this there are a number of trees, which they say lie in Munër. The tomb of Sheikh Yahêa, the father of Sheikh Shuruf Munër, is there. As we had come so far, and come so near, I passed the Sôn, and going two or three kos down the river surveyed Munër. Having walked through its gardens, I perambulated the Mausoleum, and coming to the banks of the Sôn bathed in that river."

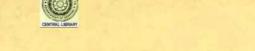
Having established the fact that the Soane, in some former age prior to 1529 A. D. united its waters with those of the Ganges in the vicinity of Patna, it is now to be considered how this fact supports the opinion that the capital of Chundragupta was situated at the junction. Sir W. Jones, Major Rennell, Wilson, and Wilford, concur that tradition assigns to this locality the ancient city of Pataliputra. Buchanan, (in page 26, Volume I. Mr. Martin's edition) has the following observation on this point: "I have found in this district (Patna) no traditions concerning Chundragupta, nor his descendants the Boliputras, although Palibothra, his capital, is by Major Rennell supposed to be the same with Pataliputra, or Patna. This city indeed is allowed by the pundits to be called Pataliputra, but Pataliputra has no great resemblance to Palibothra, nor can Patali be rationally considered as a word of the same origin as Pali, said to be an ancient name of this country and of its people and language."

The following extract<sup>†</sup>, (freely translated) from the Brihud Kutha (or Brihut Kutha,) a work supposed to have been written by Barach (Vararuchi) pundit in the time of Vikrumaditya, king of Oojeen, about 57 B. C. may not be uninteresting, as conveying a popular tradition through the medium of a fiction, which however it must be owned is more suited to the Arabian Nights than to the gravity of history.

"In Kashomunee, a brahmin named Bhoom Deo, had two sons, Kooshun and Bukshun, who married Soomut and Purmut, the two daughters of Surub Siah Mooni. Soomut becoming pregnant, the two husbands reflected that, as they had scarcely means of subsistence

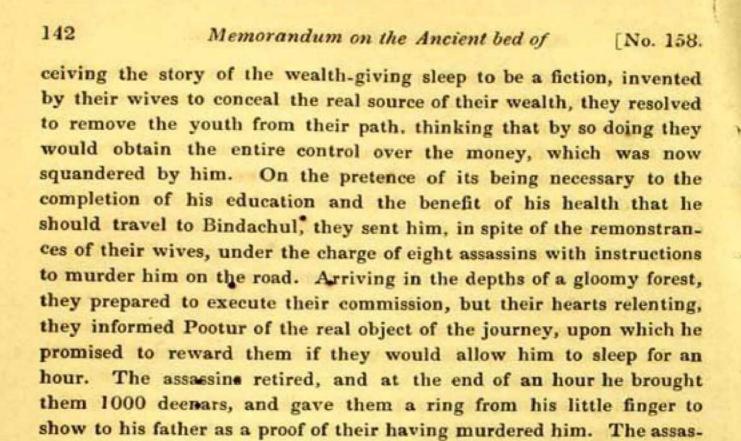
<sup>\*</sup> He probably crossed near the present Ghat or Ferry at Koilwar.

<sup>†</sup> N. B. I believe this is not literally an extract, but a Potee, or tale, founded on it by one Shunkur Dutt, and called "Patalipootur Pokyan."



sufficient for four persons, they should be reduced to starvation on the appearance of a fifth. They accordingly agreed to set off secretly in the night in search of better fortunes, and leave their wives to take care of themselves. The next morning the wives found that their husbands had deserted them, and wandered about the forest in search of them. It so happened, that Mahadeo and Parbuttee were making an excursion through the air, and the goddess seeing the distress of the two women at the loss of their husbands, entreated Mahadeo to comfort and relieve them. Mahadeo thereupon called to them, and told Soomut that the child, which would shortly be born to her, would prove to be a source of wealth instead of poverty; that whenever he awoke from his sleep 1000 deenars would be found in his sleeve. The celestial visitants then disappeared, and returned to their home at Kylas. Soon after the birth of the child, which was a boy, the anxious mother Soomut discovered, to her amazement, that whenever the boy awoke from his sleep 1000 deenars really appeared shining from under his elbows. She and her sister Purmut, therefore, speedily became rich and went to Casi, where they purchased a large house, and became celebrated all over the country for their munificence and charity. The boy, being called Pootur (or son) by his parents, was afterwards styled Raja Pootur by the people of Casi, on account of his wealth and magnificence. In the mean time Kooshun and Bukshun, the two husbands, who were residing in Karnath (Carnatic) hearing the fame of his charities, proceeded to Casi, and applied to him as mendicants for food and alms. The two ladies recognising their lost husbands, but not being recognised by them owing to the sumptuousness of their dress, placed before them an excellent repast, and inquired, who they were and whence they came? Upon which Kooshun detailed their history as above. Soomut then observed, that there was a remarkable coincidence in their histories, and proceeded to narrate how they had been deserted by their husbands; how Mahadeo had appeared to them; and how her son had been endowed with the wonderful gift, which was the source of their wealth. bands then beginning to recognise the features of their wives, the latter threw themselves upon their necks and wept rejoicingly.

"All went on happily for some time, when the husbands grew jealous of the great attention which was paid to Raja Pootur, and con-



sins returned to Casi, and showing the ring obtained their promised reward from Kooshun and Bukshun; but the two wives immediately on seeing the ring of Pootur conjectured his fate, and died on the spot. The wicked husbands were thus reduced again to the

poverty from which they had been relieved.

"In the meantime the youth Pootur proceeded on his journey, and presently encountered two Rachases, named Bunkut and Sunkut, sons of Ghurbhaj. They told him, that their father had recently died and left them three wonderful things, which they found it difficult to divide between two, and they accordingly requested the advice of Pootur as to the best method of settling the dispute. The three things were—First, a pair of wooden shoes, which had the virtue of transporting the wearer immediately to any place he might wish to go to. Secondly, a purse, out of which the possessor could draw jewels and precious stones of any kind he desired, ad libitum. Thirdly, a staff, which on being erected in any chosen spot, a beautiful city would arise and endure for ever.

"Pootur, in answer to the application of the Rachases, proposed that they should decide the matter by a race, and that whoever first reached a distant point which he indicated, should retain possession of the three prizes. Agreeing to this, and depositing the stakes with Pootur, they set off at full speed. Immediately after their departure, Pootur heard a voice from Heaven, saying, 'Put on the wooden shoes, fix the purse to your girdle, take the staff in your hand, and depart for Singhal-deep, (Ceylon).' Pootur acted accordingly, and was out of sight before the Rachases returned from their race.

"On arriving at Singhal-deep, Pootur alighted on the edge of a tank where some women were washing clothes. On seeing so handsome a youth, they declared he must be Kamdeo (the God of Love) himself. On his informing them that his name was Pootur, they declared that August Mooni had prophesied, that Patlee the daughter of the king of Singhal-deep, would marry a person of the name of Pootur, and that he must be destined to fulfil the prophecy. In the meantime Patlee had been prepared for his arrival by Narud, a Mooni, then residing at the palace, who told her that the person destined for her husband would come from Casi.

"At night while Patlee was sleeping among her hand-maidens, Pootur, having put on the magic shoes, appeared at her bed-side, and awakening told her that he was Pootur, who had come from Casi to claim his destined bride. She said, she was willing to attend him; but must first get her jewels. He replied, that it was unnecessary, as he had only to put his hand in his purse, and he could bring out what jewels he pleased; in proof of which, he suited the action to the word, and continued drawing forth jewels without end, set in the most beautiful forms. Upon this the lady said she was quite at his disposal; so he took her by the hand, and thus addressed the Spirit of the Shoe: 'Go to a spot which is north of Gya, east of the Sonebhudur (Soane river), west of the river Poonpoon, and which has the Ganges on the north.' The Spirit of the Shoe accordingly ascended with them into the air, and transported them in the course of one hour to the present site of Patna, where Pootur planted his staff, and a beautiful city arose from the ground; which, in honor of his wife, he called Patleepoora, or Pataleepooturpoora.

"On the morning after the flight of Patlee, Narud informed the king of the event, and consoled him with the reflection that, as it had been predestined, there was no help for it. Narud subsequently paid the happy pair a visit at Patlee-pootra, and informed Pootur that as the two Rachases were dead, he need be under no apprehension as to their enquiry after the three Tulismans which he had walked off with. He ordered him to keep them for 100 years, and then to go to Kylas (the



heaven of Mahadeo.) The Mooni departed after making five things: "1st. A tank, called 'Sham Tulao,' in which whoever bathed was certain to have children.

"2nd. The Goor Tulao, by bathing in which the sick were cured.

"3rd. The Moonsurwur Tulao, by bathing in which a pregnant woman was sure to have a boy.

"4th. Ram Tulao, by bathing in which the poor become rich.

"5th. Two 'Sidh Peets,' the existence of which secures to a city perpetual duration and prosperity.

"Patlee and Pootur lived very happily their 100 years, and then went to Kylas. They left behind them two sons, Koosum and Puttun, and one daughter Putnee, from whom the modern name of the city is said to be derived."

Moonshee Kunhya Loll, who translated the above story into Oordoo from the Sunscrit, has attempted to identify the site of the four tanks. He maintains with considerable gravity, that the "Jeeuj Pokur" near the Durgah of Shah Arzan, is the Sham Tulao, and that women still bathe in it with the same object. An excavation in the mohulla of Mogulpoora, called " Nalbund ke Gurha," he holds to be the Goor Tulao. A place called Sheikh Muttee in Chuk Shekarpoor, he considers to be the remains of the Munsurwur Tulao; and the khye, or ditch of Begumpoor, he boldly affirms to be the Ram Tulao. He has not ventured, however, to discover any traces of the two "Sidh Peets." In the Mudra Rakshasha, a Sanscrit Play supposed to have been written about the eleventh century, the principal scenes of which are laid at Patalipootra, the capital of Chundragupta, a passage occurs, which evidently indicates the vicinity of the city to the river Soane. It will be found in Act IV. page 106, of H. H. Wilson's translation; Molaya Ketu, who is encamped at a distance of five days' march, thus issues his final orders for the advance of his army to besiege the city and dethrone Chundragupta:-

Then let us march. Our mighty Elephants
Shall drink the Sone's dark waves, and echo back
The roaring of its waters; spread through the groves
That shade its bordering fields intenser gloom;
And faster than the undermining torrent,
Hurl its high banks into the boiling stream;



Then rolling onwards, like a line of clouds, That girts in rain and thunder Vindya's Peaks, Environ with portentous storm the City, And lay its proud Walls level with the ground.

That Patalipootra was not only in the neighbourhood of the Soane but also on the banks of the Ganges, is evident from the following soliloquy uttered by Chundragupta from the terrace of the Sûganga Palace, at the festival of the autumnal full moon, that is, in the height of the rainy season, when the river is full and rapid in its course.

How beauteous are the skies at this soft season, 'Midst fleecy clouds, like scattered isles of sand Upon whose breast the white Heron hovers, flows In dark blue tides the many channelled stream; And, like the pearly blossoms that unfold Their petals to the night, the stars expand. Below is Gunga by the Autumn led, Fondly impatient, to her Ocean Lord, Tossing her waves as with offended pride, And pining fretful at the lengthened way.

In this Play the city of Chundragupta is called by the personages of the Drama by several different names, viz. Pushpapoor, Kasumapoor, "The City of Flowers," and Patalipootra. The first cannot be identified with the name of any place in the neighbourhood. With respect to the second, it may be remarked that in the tradition above given from the Brihudkutha, the name of one of the sons of Patlee was Koosúm, from which Koosumapoor may not unreasonably be supposed to have been derived. "Koosúm" in Sunscrit means "Flowers," and Koosumapoor, the City of Flowers. There are several names of similar import at present in the vicinity. Phoolwaree, the name of a town situated on the bank of the old bed of the Soane, about six miles from Patna, means " a place of flowers," and one of the muhullas, or divisions of the present city of Patna, is denominated "Goolzar Bagh," which in Persian has nearly the same meaning, and which may have been the Mohamedan translation for Koosumapoor. Indeed it is possible, (though I cannot say it is very probable) that the different names given to the city in the Sunscrit Play, may have been the names of the different mohullas, or divisions of the old Hindoo city, which have been preserved under altered designations to the present day.

The Grom Deota, or tutelary divinity, is now Putnee Devee, to whom a small temple is dedicated, and to whom worship is still offered. Buchanan remarks, (p. 42, vol. I.) "The Goddess is said to have been placed in her present situation by Patali, daughter of Raja Sudarson, who bestowed the town now called Patna on his daughter. and she cherished the city like a mother, on which account it was called Patali-putra, or the son of Patali." According to the Brihudkutha, Putnee was the daughter of Patlee or Patali, but other traditions preserved in the Skunda Pooran, derive the name of Patna from a Sunscrit word meaning "a cloth," the goddess Parbuttee, the wife of Siva, having dropt her mantle on the spot during her flight to Kylas. In the "Pali Buddhistical annals" of Ceylon, translated by the Honorable G. Turnour, (p. 998 vol. vii. of Journal of Asiatic Society) Patali is mentioned as having been a mere village in the time of Buddho, (i. e. 541 B. C.) Buddho is said to have rested here on his way to Benares from Rajgeer, the capital of the king of Magadha, whose ministers were then employed in building a citadel for the purpose of checking the inroads of the warlike tribe of Wajjions. Buddho predicted, that the village of Patali was destined to become a great city, and that it was destined to suffer under the calamity of fire, of water, and of treachery.

It is worthy of remark, that in the memoir of the Emperor Baber no mention whatever is made of the city of Patna. The residence of the Put'han rulers of this part of the country seems to have been at the fort or town of Behar. Patna, therefore, must have ceased to be a place of importance prior to the sixteenth century. It appears from the Girnar inscription, and also from the life of Shokya, extracted from Tibetan authorities (p. 317, vol. XX. Asiatic Researches) that Asoka, the grandson of Chundragupta, continued to reside at Patalipootra, but after the extinction of the Maurya dynasty, the capital of the Gangaridæ, and of the Prachya (Prasii), seems to have been transferred to Canoge, which under the Gupta dynasty became a city of great splendour and renown for many ages. This transfer of the seat

of Government was probably the cause of the desertion of Patalipootra, and of the oblivion of the name, except when awakened from time to time by the faint echo of tradition.

The site of the capital of Chundragupta having been fixed by the evidence above adduced, the next step of the argument is to prove the identity of Chundragupta with Sandracottas the king of the Prasii, whose capital was designated Palibothra by Megasthenes, the ambassador of Seleucus Nicator, the immediate successor of Alexander the Great in the kingdom of Bactria. Athenœus, Diodorus Siculus, Quintus Curtius, Plutarch, and other historians, mention Sandracottas as the contemporary of Alexander. Professor Wilson, in his Preface to the Mudra Rakshasa, observes that "Athenœus, as first noticed by Wilford (A. R. vol. V. page 262,) and subsequently by Schlegel; writes the name Sandrakoptus, and its other form, although more common, is very possibly a mere error of the transcriber." I may here remark, that the Greek alphabet having no letter which corresponds with "Ch," the Greek historians were obliged to substitute either the X or the o. Thus Prachi (which signifies, according to Wilson, the people of the East) was converted by the Greeks into Prasii, and the river Chumbul into Sumbu. Diodorus Siculus, on the other hand, changed Chandromas, a synonyme of Chandra\* or Chundragupta, into "Xandramas." If on the principle above explained, the initial S be reconverted into "Ch," and the final "S," the usual Greek termination, be struck off, Sandrakoptas will become "Chandrakopta," which bears so striking a resemblance to Chandragupta as to leave little or no doubt of their identity. Professor Wilson has also pointed out the close resemblance between the birth, parentage and history of Sandracottas as described by the Grecian historians, and the account given of Chundragupta in the Vishnoo and Bhugwut Puranas. The similarity of names, supported by the coincidence in the history of the individuals, tends to establish the identity of persons, and no reasonable doubt can therefore be entertained that the Sandracottas of the Greeks was the Chundragupta of the Poorans.

This point conceded, (and it having been shown that Patalipootra was the capital of Chundragupta,) the identity of that city with Pa-

<sup>\*</sup> N. B. He is called by both names indifferently in the Mudra Rakshasa.



libothra (stated by Megasthenes, who visited it, to be the capital of Sandracottas,) follows as a necessary consequence.

Here the argument might be said to have terminated, but it may not be uninteresting to advert to some other coincidences, as well as to some discrepancies which have led many learned men to a different conclusion.

Arrian (page 214, Rooke's Translation,) who derived his information from the Journal of Megasthenes, says—

"The capital city of India is Palibothra, in the confines of the Prasii, near the confluence of the two great rivers Erannoboas and Ganges. Erranoboas is reckoned the third river throughout India, and is inferior to none but the Indus and Ganges, into the last of which it discharges its waters. Megasthenes assures us, that the length of this city is eighty furlongs, the breadth fifteen; that it is surrounded with a ditch which takes up six acres\* of ground, and is thirty cubits deep; that the walls are adorned with 570 towers and 64 gates."

The general resemblance in sound between Palibothra and Patalipootra is obvious, and would be more striking if we consider that the conversion of the Greek letter  $\theta$  into "th" is an anglicism, and that the French and other foreigners do not admit the pronunciation. The Greek word παλιβοθρα would therefore be rendered Palibothra, and the "b" and "p" being convertible letters, we have Palipotra. But Buchanan has remarked that Pâtali and Pali are by no means identical, the former having a distinct meaning. Pâtali Devee signifies the "Thin Goddess," whereas Pali was the name of a king, a people and a language. Wilford (p. 36, vol. IX. Asiatic Researches) says, "We are informed in the Bhagavata, that king Maha Nanda assumed the title of Bali and Maha Bali, consequently his offspring who ruled after him for a long time were Baliputras: the kingdom of Mogadha was called the kingdom of Bali, Pâli and Poli. city in which the Bali, or Paliputras resided was of course denominated from them 'Baliputra,' or 'Paliputra;' and by the Greeks 'Palibothra,' and in the Pentingerion Tables, 'Palipotra.'" In page 38, he adds, "According to Ptolemy, the country of the Baliputras extended

<sup>\*</sup> N. B. This is a mis-translation for 600 feet broad. τὸ ευροσ εξάπλεθρον.

from the Soane to beyond Moorshedabad as far as Rungāmutty." It seems evident, therefore, either that the Greeks confounded the name of the City with that of the Dynasty, or that the discrepancy in the name may be ascribed to the error of copyists of the Greek MSS. at a time when printing was unknown. Indeed the discrepancies in the spelling of Oriental names at the present day are quite as great, without the excuse afforded to the Greeks by successive copies of MSS. Moongeer is invariably spelt in our maps and in public correspondence, Monghyr; Khanpoor or Khanpur, is spelt Cawnpoor; Chandanugur, Chandernagore; Singhalpetta, Chingleput; and Mundirraj, Madras; Dihlee is variously spelt Dilli, Dehly. The right pronunciation of Patna itself is P'ut'na; of Bankipore, Bâkipoor; and of Dinapoor, Dānāpoor. The instances of such corruptions are innumerable, and will readily occur to all residents in India.

In the above quotation from Arrian, Palibothra is said to have been situated near the confluence of the Erranoboas and the Ganges. Sir W. Jones, in his Tenth Discourse, has shown that Hirunyabahoo, or Erranoboas, was a synonyme\* of the Soane. Thus the argument for the identity of the cities of Patalipootra and Palibothra is materially strengthened.

The chief objection which has been urged by Wilford, Colonel Franklin, and others against the argument is, I believet, founded on the statement of Pliny, that Palibothra was situated 425 Roman miles below the confluence of the Jumna and Ganges, which taking the Roman mile

\* N. B. All the principal rivers of India have a number of synonymes. The Ganges has, I am told, 100, which are chanted in Sunscrit verse.

A Pundit has just informed me, in reply to a question whether the Soane had any other name in Sunscrit, that it was called Hiranyabahoo in the "Amur-kosh." I do not know whether this is the work alluded to by Sir W. Jones as being 2000 years old. The names of the Jumna, the Pundit told me, were Kalindi, Soorujtunia, Jumna, and Sumunasoosa.

† Since writing the above I have met with Colonel Franklin's work. His argument is founded upon some coincidences in names which appear to be more plausible than conclusive.

1st. He quotes an extract from the Ootur Poorana, to show that the original name of a small river, now called Chundun, which unites with the Ganges west of Bhaugulpoor, was "Errun Bhowuh," or Forest-barn. He considers this to be the Errunoboas of the Greeks. This petty stream has scarcely a drop of water in it for six months in the year, and in Arrowsmith's Map, on a scale of 30 miles to an inch, it is hardly distinguishable. To reconcile this fact with the description of Magathenes that "the Errunoboas was the third of Indian rivers," Colonel Franklin has construed the text to mean "a river of the third magnitude." Then putting

English miles below Allahabad<sup>†</sup>, and 175 miles below Patna; Bhaugulpoor is only 364 English miles below Allahabad, while Rajmahl is 436; so that the proper site of Palibothra, according to this calculation, would be about half way between the two latter stations. Rennell, in his "Memoir of the Map of Hindoostan," has shown, however, that the Roman mile and Greek stadia varied so much that it is impossible to say what was the real length of the Roman mile given in Pliny's Itinerary. The following are the distances as given by Pliny.

				Roman	Miles.
Taxila on the Indus to the Hydaspes, (Jelum,)		die set	bett	120	
Fron	Hydaspes to the Hyphasis, (Beyah,)	with watch	10 m	1	390
,,	Hyphasis to Hysudrus, (Sutledge,)	1200 00		lef afron	168
23	Hysudrus to Jomones, (Jumna,)	01 07 20	00830	of the	168
,,	Jomones to Ganges,	Turis of the	nd with	a on g	112
,,	Ganges to Rhodopa	icaout	o lue	10075.7	119
"	Rhodopa to Calinipoxa, (a City,)	A73-151 S	eris de	411	167
	If oth mind have being and he would half to	Carried o	over,	eno in	1244

the Indus, Ganges, and Burumpootur in the first class; the Soane, Nerbudda, &c. in the second; he places the Chundun in the third. The Greek text however is simply ό δέ έρραννοβοας τριτος μέν ἄν ἕιη τῶν. Τνδῶν ποταμῶμ.

Puranas, which go to show merely that Bali, the son of Bhooput, begat a son called Balipootra, who was Rajah of Aungdes, that his capital (ninety-six miles by thirty-six in extent) was Balini, which however was usually called Chumpapooree. Colonel Franklin says, (I do not Know on what authority) that Chumpapooree is the Chumpanugar of the present day, a village four miles west of Bhaugulpoor; but supposing this to be so, it does not follow that Chumpapooree was ever called Palibothra. It is probable, that this Bali (who in another part of the extract is said to have had three sons "Aung, Bang and Culing," and all of whom were doubtless called Balipootras, or sons of Bali) lived long antecedent to the time of Nanda the king of Magadha, who, according to Wilford, assumed the title of Balipootras. It is very possible, that the original Bali may have dwelt at Balini, or Chumpapooree, in the vicinity of Bhaugulpoor; but this circumstance would afford no proof that the capital of Chundragupta was also situated on that spot.

3rd. Colonel Franklin states, (page 19) that in several Hindoo works Palibothra is mentioned as situated in the vicinity of bills; but he has omitted to give a single passage containing a fact so very important to his argument. It does not seem necessary to discuss the minor points of Colonel Franklin's work.

\* Adams' Roman Antiquities.

<sup>+</sup> By the Post-office Tables, it is, 227 E. miles from Allahabad to Patna.

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To Palibothra,		mong a	101 0300		425	
To the mouth of the Ganges,	Z.		FISCHED !		638	
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\* N. B .- The total is not added up in Pliny.

These distances are said to have been measured along the high road, but as they cannot be made to correspond with the distances by the present high road from the Indus to the Ganges, it is evident either that some error as to the figures has crept into the MSS. or (which is by no means improbable) that the high road 2000 years ago took a very different course from the high road at present. Rennell, in order to ascertain the length of the Roman mile assumed by Pliny, measured on the map along the line of the great road from the Hyphasis (Beyah) to the mouth of the Ganges, and finding this to be 1140 G. miles while the Itinerary gave 2022 Roman miles, he concluded that the proportion of one of Pliny's miles to a Greek mile was as 56 to 100 in horizontal distance, or 7-10ths. of an English mile in road distance. Agreeable to this mode of computation, he found Patna to be only 345 of Pliny's miles below Allahabad instead of 425, as stated in the Itinerary. This difference of 80 of Pliny's miles, or 44 Greek miles, he did not consider of much importance, as owing to the great changes in the course of Indian rivers, it was by no means certain that in former times the confluence of the Jumna and Ganges took place at Allahabad as now.

The mode of computation adopted by Rennell is not altogether free from objection. First, he has omitted to give the stages of the high road along which he measured the distance. Secondly, which mouth of the Ganges he assumed as the eastern limit. Thirdly, the precise point which he considered to be at the mouth of the Ganges. It is also to be considered that whatever point may have been assumed by Major Rennell as the mouth of the Ganges, it is in the highest degree improbable that the same point was situated at the mouth of the Ganges 2000 years ago. The progress of the Deltas of all rivers, though slow, is sure: Herodotus (Euterpe, p. 4) says that, "In the

time of Menes (\*2320 B. C.) the first king, the whole of Egypt, except the province of Thebes was one extended marsh. No part of all that district which is now situate beyond the lake of Mæris was then to be seen, the distance between which lake and the sea is a journey of seven days." In para. 13 he adds, "In the reign of Mæris as soon as the river rose to eight cubits, all the lands above Memphis were overflowed; since which a period of about 900 years has elapsed: but at present, (about 460 B. C.) unless the river rises to sixteen or at least fifteen cubits, its waters do not reach those lands." During the boring in Fort William with a view of making an Artesian well, a fossil bone was brought up from a depth of 350 feet+ below Calcutta, which evidently proves that that part of the Delta is (geologically speaking) a comparatively modern accumulation of alluvial deposits, and it is not impossible that Calcutta itself may at that period have been not far distant from the mouth, or one of the mouths, of the Ganges. According to the Mosaic account, or rather the ecclesiastical interpretation of it, the world is not yet 6000 years old. If therefore it has taken 6000 years to form the Valley and Delta of the Ganges, it may be assumed that it must have taken 2000 years to form a third of that deposit The exact point at which the Ganges flowed into the ocean at the period of creation is a geological nut, which I would deferentially submit to be cracked by Dr. Buckland, or Mr. Lyell. Geology, however, has unfortunately proved that the Mosaic chronology refers to the creation of man, and not to that of the globe. The age of the latter seems to correspond more nearly with the endless Yugs of the Vedas and Poorans, than with the more limited traditions of the Pentateuch and Talmud.

Although Rennell's estimate of the Roman mile is open to the above criticism, we may fall back upon that of D'Anville, a geographer cele-

<sup>\*</sup> This date is taken from Wilkinson's Egypt.

t See Vol. v1, page 236, Journal of Asiatic Society; also vol. 11, page 650.

The rise of the land according to the calculation of Herodotus, would be one foot and four inches, (1 f. 4 i.) in a century. In 1702 A. D. the favorable height of the Nile was 25 cubits, (being an increase of 7 cubits, or 10½ feet), in about 2162 years, (1702 + 460) or 5 inches and 8-10ths in a century. Taking the mean between 1 f. 4 i. and 5 inches  $\frac{8}{10}$ , viz. 11 inches as the average rate per century, and supposing the rise of the Ganges to have been at a similar rate, a period of 38,181 years would be required to fill up the 350 feet of sand, and alluvial soil below Calcutta; but it is probable that the rise was much more rapid prior to the reign of Mæris, i. e. 3062 years ago, (900 + 2162) than subsequent to that date—at even 2 feet to the century however, it would require 17,550 years!

brated for an accuracy in details, which was praised by Sir W. Jones, and which even Gibbon\* said he was afraid to dispute. Rennell observes in a note, "D'Anville is of opinion that Pliny turned the Greek stadia, (of Megasthenes) into Roman miles at the rate of eight to a mile, and thus accounts for their shortness. 'D'Anville, who has gone deeply into the subject, thinks that it requires 1050 Itinerary stadia to make a degree of the great circle." Now a degree of the great circle being equal to 60 geographical, or 69 English miles, 425 of Pliny's miles, or 3400 Greek stadia, would be equivalent to 223 E. miles, which is only four miles less than the real distance from Allahabad to the Golah at Patna, as given in the Polymetrical Tables of the General Post Office. So that if the estimate of the Greek stadia given by the most accurate of geographers be adopted, the difficulty of reconciling the distance given by Pliny with the site of Patna is altogether removed.

Beyond the evidence of history and tradition, however, little or nothing remains to indicate Patna to have been the site of an ancient city. It is probable that a great part of the original city has been swallowed up by the Ganges. In a map lately constructed by the Revenue Survey, and from decrees of the Civil Courts, it appears that the main stream of the Ganges even so late as the Permanent Settlement, or 1790 A. D. was several miles north of its present course. The river is gradually wearing away the southern bank, and the modern city is likely to share the fate of the old.

In point of extent the modern town, including the suburbs, does not fall very far short of that of the ancient. Megasthenes states Palibothra to have been ten milest long, and about two broad, surrounded with a ditch, and walls adorned with 570 towers and gates. The length of the present town from the Golah at Patna on the west to Jafir Khan's garden on the east, is about the same length; but the breadth cannot exceed a mile. It is just possible that the "Sotah," or bed of a small stream, exhibited in the map as running south of Patna from Phoolwaree to near Futwa, may have been the ancient ditch of Palibothra, as it does not appear to have been ever the main stream of the Soane. Of the gates and towers no traces remain. There are, however, some high artificial eminences composed of brick-work, called "Punj Puhâree," or five hills, about a mile or two south of the town, which may be the ruins of bastions or towers. There are likewise some

<sup>·</sup> Miscellaneous Works.

<sup>+</sup> Calculated on D'Anville's principle, it would be much less.



other singular elevations in different parts of the town or neighbourhood, evidently composed of the ruins of buildings of considerable magnitude. One near the Durgah of Shah Arzān, another at Bikna Puhâree, on which a large European house has been built, another near what is called the Dutchman's house, and a fourth at Chujjoo Bagh, on which the house I reside in is situated. It must be admitted, however, that tradition does not agree in assigning such an origin to these elevations. As the southern bank of the Ganges gradually gives way to the undermining power of the current, several old brick wells, long since closed and built over, have been discovered, and in the rainy season many ancient Hindoo coins gold, silver, and copper are found. Gold ones of the Gupta or Canoge series, and Boodhist coins of cast silver and copper are the most common.

It is not, however, a matter of surprize, that the waves of time should have obliterated what those of the Ganges may have spared, in a country where the destructive power of vegetation is so great and rapid.

In 2000 years how many cities, empires, and even religions, have passed away! Of Babylon, Susa, Ecbatana, and Persepolis, cities cotemporary with Palibothra, scarce a stone remains to mark their site to the puzzled antiquary. "Assyria, Greece, Rome, Carthage, what are they."\*

The empires of Montezuma and the Incas have likewise risen, flourished, and disappeared within that period. The religions of Zoroaster, Osiris, Jupiter, and Odin, have been superseded by that of the Crescent or of the Cross. When cotemporary cities have perished, and cotemporary empires have decayed, there is little room for wonder that nothing should remain of the capital of Chundragupta save a few mouldering heaps.

Tempus edax rerum! tuque in vidiosa Vetustas, Omnia destruitis; vitiataque dentibus ævi, Paulatim, lenté, consumitis omnia morte.

Omnivorous Time! and thou invidious Age, Consumest all things in thy wanton rage. Worn, day by day, by Time's remorseless teeth, Man and his works at last must sink in death.

E. C. R.



Proceedings of the Asiatic Society for the month of FEBRUARY, 1845.

The Monthly Meeting of the Society was held at the Rooms, on Tuesday evening, the 25th of February, at half-past seven r. M. S. G. T. Heatly, Esq., in the chair.

The following report was read by the Secretary, being that of the preliminary Meeting of the Committee of Papers for the despatch of business.

Secretary's Memorandum for the Meeting of 25th February, 1845.

An Oordoo novel, by Mr. J. Corcoran, written to exemplify the capacity and power of that elegant Vernacular language, and on which I was enabled to report favourably, philologically speaking, is recommended by the Committee of Papers to the patronage of the Society, by a subscription for fifteen copies, at four rupees twelve annas each. The Committee will examine further as to whether this work is worthy, on the whole, of being recommended as a school-book, for which its author intended it.

Resolved-That fifteen copies should be subscribed for, and the work further examined.

I have received and laid before the Committee a valuable suggestion by that eminent Oriental scholar, Dr. A. Sprenger, for the commencement of the publication of a Bibliotheca Asiatica, or a series of standard works in Eastern languages, edited and translated under the superintendence, and at the cost, of the Society. This useful undertaking, projected nearly forty years ago, is now revived; and as the Committee are in a position to assure the Society that they can command copious and valuable material for its commencement, they strongly recommend to the Society that the proposition be entertained, and that they be empowered to direct their attention to the subject, and report as early as they can what measure can be taken in furtherance of the undertaking.

Ordered-That the further report of the Committee be awaited, the Society acknowledging the expediency of the suggestion, and thanking Dr. Sprenger for it.

A letter from Government having been received, with copies of communications from Capt. Marshall, Secretary to the Sanserit College, and a Mussulman printer by name Abdoolla, sometimes called Molvee Abdoolla, well known to the Society, respecting the printing of the Musnuvee Roomee, I have been instructed to submit a note on the subject to the Committee, as the opinion of the Society is requested by Government as to the proposed printing of the work which had already, as noted by me, been suggested to us. A detailed report will be made at our next Meeting.



Resolved-That the report be received, and discussed at the next Meeting.

I am directed to state to the Society, that the Committee of Papers have recorded an opinion as to the hour of meeting of the Society, not in consonance with the note of the meeting before last. It was then decided, that the hour should be half-past Seven; the large majority of the Committee incline decidedly to the old hour of half-past Eight P. M. The opinion of these gentlemen necessarily carries so much weight with it, that the minority desire the question to be re-submitted for your consideration.

Resolved-That the next Meeting be held at & past 8, experimentally, and the question then be considered open for discussion.

A letter from Mr. Ince, Superintendent of Salt Chokees, on some of the salt springs in the Chittagong district, to my address, has been referred, with the thanks of the Committee, to our Geological Curator.

A set of lithographs of some of the Cave Temples of the Dukhan, by James Fergusson, Esq., presented by his brother, W. Fergusson, Esq., have been duly received, and the handsome donation richly merits your thanks.

A letter from Captain Crommelin, with note of despatch of Geological specimens from Darjeeling.

A letter from Mr. A. Campbell of Darjeeling, forwarding an interesting account of a new Thibetan antelope, with remarks on the Zoology of Thibet.

Reports from Government respecting the recent supposed Sub-marine Volcano on the coast of Arracan, in reply to our letter, suggesting enquiry on this subject.

Valuable geological notes across the Peninsula of India, by Capt. Newbold of the Madras Army, have been referred to the Geological Curator, and ultimately held available for our Journal.

Observations on the rate of evaporation in the open sea, with notice of an instrument used in indicating its amount, by J. W. Laidley, Esq.

A memorandum on the old bed of the river Soane and site of Palibothra, by S. C. Ravenshaw, Esq. C. S., has been received by me, and will be held available for the Journal, the thanks of the Society being due to its author.

For the above, the thanks of the Society were voted.

We have received a gratifying letter from the Honorable Secretary to the Royal University of Christiana, acknowledging the receipt of some of our contributions, advising us of the proximate despatch of various objects for our Museum, and couched in terms expressive of the satisfaction of that learned body at finding itself in that constant communication with us, which it will be not less to our credit than to our advantage to foster and encourage to the best of our ability.

I have also to submit the epitaph to be placed on the tomb of our lamented friend, Csomo De Korosi, as approved by the Committee.



н. J.

## ALEXANDER CSOMA DE KOROSI,

A NATIVE OF HUNGARY, WHO, TO FOLLOW OUT PHILOLOGICAL RESEARCHES, RESORTED TO THE EAST,

AND AFTER YEARS PASSED UNDER PRIVATIONS, SUCH AS HAVE BEEN SELDOM ENDURED, AND PATIENT LABOUR IN THE CAUSE OF SCIENCE,

COMPILED

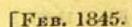
A DICTIONARY AND GRAMMAR OF THE THIBETAN LANGUAGE, HIS BEST AND REAL MONUMENT.

ON HIS ROAD TO H'LASSA TO RESUME HIS LABOURS HE DIED AT THIS PLACE ON THE 11TH APRIL, 1842. AGED 44 YEARS.

> HIS FELLOW LABOURERS, THE ASIATIC SOCIETY OF BENGAL, INSCRIBE THIS TABLET TO HIS MEMORY.

> > REQUIESCAT IN PACE.

J. Weaver, Sculpt. Calcutta.





The slab with this inscription has been despatched to Darjeeling, to our fellow labourer and associate, Dr. Campbell, Superintendent at that station.

The two following letters from Mons. Eugene Burnouf, of the Asiatic Society of Paris, and from Count Scopoli, Secretary to the Academy of Verona, have received the attention they merit in due course; Mr. Heatly having charged himself with obtaining the eggs of the Phalena required by the latter Society.

H. TORRENS.

V. P. and Secy. As. Soc.

Note.—The following letter from Lieut.-Col. Ouseley, I publish at his desire, clearing up a mistake which would seem to have occurred respecting the survey of the Nurbudda river, published in a recent number of the Society's Journal. I need only add, that Lieut.-Col. Ouseley, has placed the remainder of the map at the disposal of the Society, and that it will be lithographed for speedy publication.

H. TORRENS,

V. P. and Secy. As. Soc.

My DEAR SIR,—I observe in No. CLI. of the Journal, a map of the Nerbudda, forwarded with Mr. A. Shakespear's letter. 1 find that Mr. Shakespear has remarked in a note, page 497, "The original survey is not to be found on record, Capt. Ouseley appears only to have submitted the result of it with his opinions."

This is written without reference to the map itself, which is actually that done by me, (from the Devnaguree original) every word of which is written in my own hand, and certified by me in the map, which is reduced, as mentioned by the lithographer, to one-fourth.

As I had a great deal of trouble in making it, it gives me much pleasure to see it where it is. The survey, at considerable expense to the Government, was only sanctioned by Lord William Bentinck on my repeated representation.

I have the original sketch, and the only copy I made for the Government is that from which Mr. Smith reduced the one now presented to the public. I mean to have it lithographed over again, as the most valuable part is left out, and the eastern course of the river beyond Babye, that part on which the coal and iron mines are situated, which minerals will I trust be the means of creating the most surprising and beneficial changes in the country, in supplying material for a grand trunk rail line across India.

May I request the favor of your giving this letter a place in the next Journal.

I am, my dear Sir,

Yours very faithfully,

Calcutta, 22nd February, 1845.

J. R. OUSELEY.

To the Vice President and Secretary of the Asiatic Society of Bengal, at Calcutta.

SIR,—I have had the honor of receiving your letter, dated the 13th August, this year, and I think it my duty to lose no time in answering the same. It is about a fortnight since the Royal University of this town received two boxes of tinned iron, containing a collection of ornithological preparations and other objects of Natural History, some Indian coins, and a catalogue of books and manuscripts in the Indian languages, belonging to the Asiatic Society. We have also in July last, received a parcel with seeds, like another which arrived about a year ago. The Senatus Academicus has



resolved with respect to these different presents, to return its best thanks in a letter to the learned Society, and to accompany the same with a collection of different objects belonging to the Natural History of these northern countries, viz. zoological preparations, plants, minerals and seeds, as also with a collection of books, being a continuation of the works already sent. These things, the arrangement of which has been left to the care of the undersigned, are partly ready to be sent; what is still wanting will be collected during the next winter, and sent off with the first opportunity in March 1845.

The University at Christiania looks upon the existing scientific intercourse with the honored Society, as very interesting to both institutions, and will do any thing in its power to continue the same. The University Council, or Senatus Academicus, will also declare this in its above-mentioned letter, but I have thought it right to mention it in this preliminary notification. Books or any other things than the above-mentioned have not been received from your Society; as soon as any thing arrives, I shall have the pleasure of announcing it.

Sir Charles Tottie, the Norwegian, and Swedish Consul General at London, will forward any box or parcel for the University of Norway, directed to his care. Captain Bownevie of the Norwegian Navy at Rungpore, to whom we are indebted for the existing intercourse between the two institutions, has also always shown the greatest willingness in forwarding scientific objects to this University. In conclusion I have also to state, that your letter, dated 20th May last, (which arrived at the end of last month,) has been communicated to all the professors whom it concerns.

Sir, your obedient servant,

C. HOLST,

Secretary of the Royal University at Christiania.

Christiania, the 24th October, 1844.

M. H. Piddington, Secretaire adjoint de la Societe Asiatique du Bengale.

Monsieur.—Le départ de Mr. Mohl, notre Secrétaire du Conseil mà laissè le soin de vous remercier au nom de la Société de la peine que vous avez bien voulu prendre de nous informer de la mort si regrettable du savant-Ramcomul Sen. Il sera bien regretté de la Société qui savait les services qu'il a rendus aux lettres et à la civilisation en général en composant son excellent dictionnaire Anglais et Bengali. C'est aussi pour nous une perte, parceque nous pourrons difficilement retrouver un correspondant aussi instrûit et aussi zélé.

Mr. Mohl, à son prochain retour, doit s'entretenir avec vous de cet objet, et il vous rendra compte de la vente des Livres de votre Société que nous avons placés a Paris.

Excusez la forme un peu courte de cette lettre. Igorant exactement le nom et les titres de Hurremohun Sen, que nous n'avons pu bien lires j'ai cru pouvoir inclure la lettre que nous lui adressons dans ce court billet. Je vous serais bien reconnaissant d'y faire mettre son adresse exacte.

Votre bien dévoué serviteur, Eugl. Burnour.

24 October, 1844.

A la Société Asiatique, Calcutta.

Les rémarques faites par M. M. Helfer et Ugon sur les phalénes, dont aux Indes on tire la soie, ont excite l'attention de cette académie, et le plus vif desir d'avoir des oeufs de l'espèce Cynthia, puisqu' on cultive ici le Ricinus dont les feuilles nourissent ses



vers producteurs, c'est vrai, d'un tissu soierie qui n'est pas fin, mais qui peut être utile a certaines manufactures. L'education ailleurs de ces vers se ferait dans notre province dans un tems presque tout à fait libre d'autres travaux agricoles. C'est pourtant à la Société Asiatique qu'on ose s'adresser pour avoir les nouveaux œufs, et on éspére qu'elle acueillera cette priere avece le même intéret, qu'elle donne aux progrés des sciences dans les vastes etablissement Brittaniques, en Asie, qu'elle nous fait connoître sous tous le rapports. L'amour du savoir, et le noble plaisir des répandre les connoissances utiles, rapprochent les plus grandes distances, et font une seule famille parmi ceux qui sont capables de viser à l'un et de gouter l'autre. Si jamais cette academie pouvait être honoreè de quelque commission par un Societé dont elle reconnait la supériorité, elle en serait non seulement reconnoissante mais orgueilleuse.

Veronne, le 10 Aout, 1838.

Le Secretaire perpétuel,

Jean Comte Scopoli; Jadis Conseiller d' etat,
et directeur général de l' instruction publique,
dans le Royaume d' Italie.

Read the following-

REPORT OF THE CURATOR, MUSEUM OF ECONOMIC GEOLOGY, AND GEOLOGICAL AND MINERALOGICAL DEPARTMENTS, FOR THE MONTH OF JANUARY, 1845.

Captain J. H. Low, B. N. I., has presented us with some fine specimens of lava and capillary obsidian, and some of sulphur from the volcanic specimens from Manilla: his letter is as follows:—

#### H. PIDDINGTON, Esq.

MY DEAR SIR,—I beg to present to the Asiatic Society the following specimens brought from the grand volcano of Killauea in the Island of Hawaii, four pieces of lava, six pieces of sulphur, and some capillary glass; also two tapas or native cloths, and a skull of some animal which I picked up at the spot where the bones of the celebrated navigator Capt. Cook were buried, being about one mile from the spot where he was killed. Should you wish for it, I can send you some specimens collected by me at the volcano, in the lake de Taal de Bonbon, in Luconia, about 50 miles from Manilla. It may be interesting, sending a small bit of the rock on which Cook fell at Korakaruah Bay, which I broke off. Had you not access to better information relating to the Sandwich Islands than I could give, I should be happy to give my mite.

No. 5, Garstin's Buildings, 16th January.

J. H. Low.

My DEAR SIR,—I have the pleasure to send you some specimens from Manilla, or rather the large piece I picked up in an extinct crater, which is at present a small lake, close on the margin of the great lake in Luconia. The spot on which I picked up this specimen, is a lake evidently filled from the great lake; it occupies the sunken summit of the hill, densely clothed with timber, only one mile from the hot bath, which I found on keeping the Therm. for sometime in it to rise to 170° Faht.

The smaller specimens I collected at the volcano in the Island in the lake de Taal de Bonbon. The ignorance of the people in Manilla was such that they wanted to

<sup>\*</sup> Killauea in MSS. No doubt Kirauea of Mr. Ellis and other travellers .- H. P.



persuade me the Island had been formed within fifty years, and was only of mud, I picked up these specimens. Although within 60 miles of Manilla, such is the information to be obtained there. I send you also a bonnet from the Sandwich Islands, such as worn by the native ladies there, and made by them.

J. H. Low.

The following Diary accompanies the specimens referred to in it, from the Hot Springs of Chittagong.

My DEAR Mr. Torrens,—I will now endeavour to give you some account of my travels, but fear it will prove but an imperfect one. On the 9th of this month I reached Seetakoond, where I began my inquiries about the springs, and the next day visited the nearest. I left my tent a little after 11 a. m., and was soon obliged to leave my palkee behind. A walk of little more than half an hour over the bed of what must be an awful torrent during the rains, brought me to the spring; it is raised a little above the bed of a small nullah, which branches off from the torrent bed: the spring is about eight feet by six, and not more than a foot and a half deep; in three or four places the water rises in small bubbles: it is quite cold and beautifully clear; it is nearly double the strength of common sea-water. The great drawback is the difficulty of approach. The spring has no particular name, but is known by the Pergunnah in which it is situated—Pantaseelah; beyond it and in a continuation of the road I went, (if it can be so called) is the Doburrea or Dobic Kedallah or Pass, which goes direct through the hills and is said to have been cut by a Dobie. I struck off from the main road at a village called Yakoobnuggur. I believe, I am the first European who has ever visited this spring.

On the 11th I went on to near Jeygopal's hauth, and then left the main road, from which in about half an hour I reached the famous spring called Nabboo Luckee, the distance being about two miles, rather more. This road is generally good, but over the torrent bed, which is much the same as the other; the rush of water must however be greater in the rains, and during that season the people who attend at the spring are obliged to make use of a narrow foot path over the hills; it is situated on a rising ground of about 8 or 10 feet above the bed of the stream, a temple is erected over it, and I had to descend about half a dozen steps. The pucka part round the spring is about three feet square, and not more than three feet deep; on the right hand side is a small place raised about a foot and a half above the other parts, but communicating with the spring, and from the hole marked A, in my sketch, a flame issues, which is constantly fed with ghee; conceiving that there might be some tricking I made them put the light to the hole marked B, when a beautiful blue flame issued, such as would not have been caused by ghee alone; on the left hand is a spout, which goes through the temple wall into the spring, and through which is a constant flow of the water; within the spring is a sound resembling the growl of a dog, repeated about every second, when a large bubble rises to the surface, and bursts a few yards to the left; and a little above the bed of the torrent is another spring, called Duddee Koond, bubbling up in the same manner as the first I saw; the water of the three is of the same strength. On the 14th, I set off to visit Soorjoo Koond, but there was so much uncertainty about the distance and exact spot, that I was induced to try the strength of the water about half a mile from the main road, and found it about one-third less in strength than the other springs. I then went to the one considered by the natives as the most holy; it



is called Boolooa Koond. The greater part of the road is excellent, being cut from the side of the hills; the spot on which the spring is situated is considerably elevated above the plain, but the ascent is very gradual, the hills are thickly covered with jungle, amongst which appears the wild plantain. On arriving at the foot of the spring, I had to mount some twenty steps; at the top were several temples, the principal one covering the spring, which they told me was fathomless. A small place is raised at the side, the same as at Nubboo Luckee, from which issues a flame well fed with ghee; through the lower hole opening from the surface of the spring, a flame is constantly coming out and running a short distance on the water, but goes out again immediately. I have no doubt the ghee has something to do with it; the water is fresh with a slight sulphurous smell and taste; but to enable you to form a better idea of it than I can give, I send by my friend Major Troup, two small boxes to your address, one containing three bottles of water from the Nubboo Luckee and Boolooa Koond, and one taken up about half a mile from the main road, and which is said to come from Soorjoo Koond, and other springs, both salt and sweet; but I was afraid to remain out any longer lest I might lose my travelling allowance, and I could not afford that. The other box contains large and small pebbles, a kind of unformed slate, and some gravelly earth taken from the bed of the torrent, and a small piece of coal which I picked up on the edge of the stream running from the Soorjoo Koond; a small bottle of Kurkutch from the Soorjoo Koond water, and some salt which I can hardly venture to call pangah, it was from the Nubboo Luckee water filtered through some salt earth I brought from the spring; I must leave you to decide what it is.

ROBERT INCE.

P. S. I find that I have expended all the Soorjoo Koond water, so that you will find only two quart bottles. The whole of these places are, I conceive, of volcanic origin, for small flames are to be seen in many places, issuing from the ground. I regret much now that I could not visit any of them, but hope to do so when I again go in that direction.

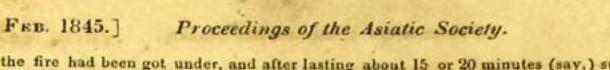
Through Captain Duncan, B. E., we have received from Lieut. T. C. Blagrave of that corps, now in Scinde, two boxes containing fossils (mostly shells,) and one containing fish preserved in salt, together with a large fossil shell from Rorce, by Captain W. E. Baker, Engineers.

These fossils are of very great interest, and in connection with the geological specimens promised us by Captain Baker, will no doubt throw light on the geology of that new country; but we have as yet no note of the localities in which the fossils and shells were collected.

We received from Captain Williams, our active correspondent at Kyook Phyoo, the following letters, giving an account of a remarkable appearance seen at sea from that and other of the Arracan stations.

## H. PIDDINGTON, Esq., Sub-Secretary, Asiatic Society of Bengal.

MY DEAR SIR,—Yesterday evening, at between 5 and 6 o'clock, as we were taking our ride, we were alarmed by an extraordinary appearance far out at sea, as if a vessel was on fire: the reflection of the flame was made on a dark bank of clouds, west of the station, on the track of ships from hence to Calcutta: it flickered several times as if



the fire had been got under, and after lasting about 15 or 20 minutes (say,) suddenly went out. Various are the conjectures: I thought it was the reflection of the sun from below the horizon, but the sudden light of flame was too brilliant, and unsteady to be the sun's light; electricity in the cloud was stated to be the cause, but this is not a season for such cause: " a ship is on fire," many said; but this morning the prevailing opinion is, that a volcanic eruption has taken place 20 miles out at sea, similar to what I reported as having taken place near Chedooba. The argument against its having been a ship on fire is, that the flame shewing so brilliant and so great a light could not be so suddenly extinguished as this was, the dark bank of clouds may have been formed of the smoke of the volcano. I hope some further information than what is obtained from mere conjecture will be gained, which I will not fail to communicate to you. The Amherst is said to have left, or was to leave Calcutta yesterday, so she cannot be far enough out to see it.

D. WILLIAMS.

P. S .- A small comet was also seen at the same time as the fire, which soon set; it was situated a little south of the supposed volcanic eruption.

We shall see the comet of course this evening, and I will write by next date.

D. W.

Kyouk Phyoo, 3rd January, 1845.

MY DEAR SIR,-As I was at a distance from the beach when the fire appeared last evening, Ensign Hankin of the 66th N. I. has most kindly given me a description of what he saw and heard, and I have the pleasure to enclose it, to be laid before the Society.

Kyouk Phyoo, 3rd January, 1845.

D. WILLIAMS.

#### Major WILLIAMS, Kyouk Phyoo.

MY DEAR WILLIAMS,-I have complied with your request for a description of the extraordinary phænomenon witnessed here last night, but I am afraid in a very imperfect manner.

G. HANKIN.

On the night of the 2nd of January 1845, between the hours of 6 and 7, a very interesting and singular phænomenon was observed off the coast of Kyouk Phyoo. The sky on the horizon was observed to brighten up as when illumined by the rays of the setting sun, excepting that the light more resembled the flickering of a fire than the gradual descent of that luminary. It continued in this way for half an hour or so, when all of a sudden immense volumes of flame were seen to issue, as it were from the depths of the ocean, presenting the most sublime yet awful spectacle to the beholders. The general idea entertained, was, that a ship had caught fire; but this was soon dispelled by a low continuous rumbling, which seemed to sound from the bowels of the earth, and was re-echoed by the surrounding hills. Previous to this, however, Capt. Howe, the marine superintendent, had with the greatest promptitude set off in H. C.



Schooner "Petrel," intending to render assistance to the supposed unfortunates of the burning ship; he returned without seeing any thing, and it is thought that the whole was the result of some hidden volcanic agency; one of the neighbouring hills possessing that extraordinary property, and from which flames have been seen to issue before. The weather at the time was still and serene, hardly a breath disturbed the air: it was in fact, as some one observed, a very earthquaky day.

Kyouk Phyoo, 3rd January, 1845.

I wrote immediately to Captain Paterson of the H. C. S. Amherst, then in the river, to enquire if he had any knowledge of this phenomenon, and his answer is as follows:—

My drag Mr. Pidemoton,—The appearance of the eruption of a volcano took place some days before we reached Arracan. I heard of it from several parties when I got there. The bearings were taken by the following gentlemen: by Capt. Howe at Kyouk Phyoo, by Capt. Siddons at Akyab, and by Capt. Watson, commanding the Govt. Schooner "Spy," off St. Martin's Isle to the North. As I did not receive a very correct account, but understood that it was officially sent up, I did not trouble myself further than to enquire in what direction it took place. From all I can now remember, by the bearings, it was about fifteen miles to the South of the "Western Balongo," near which is a Shoal patch of Coral; the least water I ever found was eleven fathoms. Lloyd and Ross in the Chart lay down seven fathoms. It seems to have alarmed some of the people at Kyouk Phyoo, but if you require further information, the whole of the officers of the 66th N. Infantry that saw it are encamped on the plain below the Fort.

J. PATERSON.

As it was important that time should not be lost, the following letter was addressed to Government, under the direction of our Secretary.

#### F. HALLIDAY, Esq., Secy. to Govt. of Bengal.

SIE,—By direction of the Committee of Papers of the Asiatic Society, I have the honor to submit the accompanying extracts of letters from Captain Williams, 1st Assistant to the Commissioner of Arracan, and from Ensign Hankin, giving details of a curious phænomenon seen at sea; which, by these accounts, and those collected by Captain Paterson, H. C. S. Amherst, were probably occasioned by the eruption of a sub-marine volcano.

As this may also have given rise to a new Island or a shoal, as was the case off False Island in August 1843, where a new Island appeared, but sunk shortly afterwards, the Committee respectfully suggest that orders might be given to Captain Paterson, on the approaching voyage of the Amherst, to examine the spot; as in a mere hydrographical point of view, as well as the geological interest of such phænomena, the knowledge, even of any alteration of the soundings, must be of much public interest.

H. Tornens,

Vice President and Secretary, Asiatic Society.



## FEB. 1845.] Proceedings of the Asiatic Society.

In reply to which we have received the following with an official report.

(No. 450.)

From the Under Secretary to the Government of Bengal, to the Vice President and Secretary, Asiatic Society, dated Fort William, 12th February, 1845.

Marine.

Sig,—I am directed to acknowledge the receipt of your letter, without date, submitting extracts from letters, regarding the eruption of a sub-marine Volcano, seen from Kyouk Phyoo, and conveying the suggestion of the Committee of Papers of the Asiatic Society, that Captain Paterson, on the approaching voyage of the "Amherst" to that station, may be instructed to examine the spot with a view of ascertaining the effects that may have been thereby produced.

2. The Acting Superintendent of Marine having also forwarded a correspondence referring to the Volcanic eruption in question, I am directed, in reply, to forward copies of these documents; from which it will be observed that, under the orders of the Commissioner of Arracan, all that is necessary has been done, but that no ascertained effect has been produced by the eruption, and that the soundings on the Arracan Coast continue as heretofore.

CECIL BEADON.

Under Secretary to the Government of Bengal.

(No. 366.)

From Lieut.-Colonel A. Invine, C. B., Acting Superintendent of Marine, to the Right Honorable Sir Henny Hardinge, G. C. B. Governor of Bengal, dated Fort William, the 24th January, 1845.

Copy of a Letter, No. 8, correspondence noted in the margin, referring to a grand Voldated the 14th January, 1845, from the Commissioner of Arracan, with enclosure.

2nd. No ascertained effect has been produced by this Volcanic eruption, and the soundings on the Arracan Coast remain as before; but the occurrence seems sufficiently interesting to be reported, and if it meets with your honor's approval, I would forward copies of the correspondence to the Asiatic Society for record.

Fort William, Mar. Supdt.'s Office, the 24th January, 1845. (Signed) A. IRVINE,

Acting Supt. of Marine.

(No. 8.)

From Capt. A. Bogle, Commissioner in Arracan, to Lieut.-Col. A. IRVINE, C. B. Superintendent of Marine, Fort William, dated Kyouk Phyoo, the 14th January, 1845.

Str.,-A very grand Volcanic eruption having been observed N. N. W. of Kyouk Phyoo, a little after sun-set on the evening of the 2nd instant, I directed Mr. Howe, Marine Assistant, to proceed to the supposed spot for the purpose of ascertaining whether any rocks had been thrown up or any change had taken place in the soundings; I have the honor to annex copy of his report, by which it appears that he has not been able to discover any alteration whatever.

2nd. I also annex extract from a report from Mr. H. B. Weston, commanding the " Spy," who saw the eruption off the Asseerghur Shoal ; it was also seen from Akyab, and I would observe that the bearing taken by Mr. Weston at sea, by Mr. Howe at Kyouk Phyoo, and by the officers at Akyab, place it in 19° 42' 15" N. latitude, and 93° 4' 45" E. longitude, bearing S. 3 E. from S. end of Western Borongo.

3rd. On Mr. Weston's way down to this post, he sounded carefully for indications of the Volcano, but without effect; and since he arrived, the "Tenasserim" steamer with the "Amherst" in tow, must have passed near to it, without observing any change in the soundings.

4th. Mr. Weston will, however, be directed to make further search in the course of his cruising.

5th. I may add, that a small comet made its appearance in the S. W. on the same evening that the eruption occurred, and has been visible every night since.

Arracan, Comm.'s Office,

(Signed)

A. BOGLE,

Kyouk Phyoo, the 14th January, 1845.

Commissioner in Arracan.

· (True copy,)
(Signed) JAMES SUTHERLAND, Secretary.

Fort William, Mar. Supdt.'s Office, the 24th January, 1845.

(No. 4.)

From H. Howe, Marine Assistant Commissioner, to Major A. Bogle, Commissioner of Arracan, dated Kyouk Phyoo, the 8th January, 1845.

SIR,-I have the honor to inform you, that according to your directions, I proceeded on the 6th instant in search of any effects that might be visible of the Volcanic eruption on the 2nd instant.

Having observed the eruption, and the spot where the flames appeared to rise up out of the water, I set it by compass at W. N. W. from the Flag Staff, and reckoning the distance from the place of observation to be about 16 to 18 miles, that would place any rock or shoal that might have been thrown up, or any discoloured water, about 5 to 8 miles to the north of the northern breakers off the Terribles.

I accordingly proceeded to this spot and cruised about, carefully sounding and keeping a good look-out from the mast-head in a circle, from Lat. 192 27' to 192 36', Long. 93° 16' to 93° 25' E.

Not the smallest appearance of an eruption baving taken place was observed in this direction, nor the slightest trace of its effects; the soundings were all regular as laid down on the charts; and having before had the coast, from the extreme point of my observations up to northward, carefully surveyed, though out of the line of bearing, I have returned in with the conclusion that no rock or shoal has been cast up by the late action of the Volcano, nor have the soundings been at all affected, nor the channel disturbed.

From this up to the northward and westward, the ground has been repeatedly passed over by salt brigs and vessels belonging to the Flotilla, by none of which has any thing extraordinary been observed.

M. A. C.'s Office, Kyouk Phyoo,

(Signed) H. Howe, Mar. Asst. Commissioner.

the 8th January, 1845.

Extract from a letter from Mr. H. B. Weston, Commanding the Hon'ble Company's schooner "Spy," dated 11th January 1845, No. 4.

"At 6 P. M. on the 2nd instant, I observed a large fire S. E. by S. (being then off the Asseerghur Shoal), from which was thrown up five different times large masses of fire. I supposed it to be a volcanic eruption, and in coming down the coast sounded to see if any alteration had taken place, but found none; I went into Akyab, and having got a bearing from there, proceeded in the direction, sounding, but have no alteration more than a fathom, and that in steep places.

"I also kept a look-out for burnt wood in case it might have been a vessel burnt, but found none: I have enquired of the vessels boarded, and they give a similar description of it; a Chinese Junk excepted, who stated it to be a ship on fire, but had seen no traces of her, though he went in the direction."

(True copy and extract,)

Fort William, Mar. Supdt.'s Office, the 24th January, 1845. (Signed) A. Bogle, Commissioner of Arracan.

(True copy,) (Signed)

JAS. SUTHERLAND, Secy.

(True copies,)

CECIL BEADON,

Under Secy. to the Govt. of Bengal.

It would appear from the foregoing, that there can be no doubt of the phænomenon, and extremely little probability of its having been a vessel on fire. As connected with the former eruptions in that quarter, all these notices are of the greatest interest, and we are fortunate in possessing there in the persons of Captain Williams and his friends, such zealous observers and reporters.

We have also received from Captain Newbold, M. N. I., a valuable paper on the Geology of Southern India, which, as soon as the diagrams can be lithographed, will I

hope adorn our Journal; Captain Newbold promises a continuation of his paper, and from his teal, opportunities and talents, we may expect all which they can accomplish under the disadvantage, common to all scientific votaries in India, of being sadly circumscribed as to time. From Mr. Ince of the Salt Department, we have received through Mr. Torrens, bottles of water, and a box of rocks and pebbles from the salt springs in the Chittagong district, with a letter giving an account of his visit to them. I have not yet examined them, as they arrived very late.

Lieut. Baird Smith has just forwarded Part III, of his valuable papers on Indian Earthquakes, which will also be no doubt forthwith published.

Lieut. Sherwill has referred to us a small box of specimens of limestones from the Museum of table-land of Rhotasghur, requesting me to select those Economic Geology. most likely to prove useful as lithographic stones. From minute fragments it is next to impossible to judge; but I have returned them to him, with the most likely specimens separated from those decidedly bad; and, as he promises us slabs, we shall then be enabled to give them a fair trial.

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Fice-Presidents,... The Honorable Sir J. P. Gannt.
The Honorable Sir H. Seton.
H. W. Torrens, Esq.
Lieut.-Col. W. N. Forbes, B. E.

Secretary, H. W. Torrens, Esq. Sub-Secretary, H. Piddington, Esq.

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W. Grant, Esq.
W. Seton Karr, Esq., C. S.
W. B. O'Shaughnessy, Esq., M. D.

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Curator Geological and Mineralogical Departments and Museum of Economic H. Piddington, Esq.

Geology.

Librarian, Dr. E. Roer.

Accountant and Assistant to the Secretary, Mr. W. H. Bolst.

Assistant Librarian, Mr. J. Tucker.

Tuxidermist, Mr. J. Nicolus.

Treasurers, Bank of Bengal.

Agent in London, Professor H. H. Wilson, India House.

Agent in Paris, Major A. Troyer, 55, Rue de la Pepiniere.

Booksellers and Agents in London, Messes. W.& J. Allen, Leudenhall street.



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Avdall, Esq. J.

Baker, Capt. W. E.

Barlow, Esq. R.

Barwell, Esq. A. C.

Batten, Esq. J. H.

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Bishop of Calcutta, Rt. Rev. Lord.

Bogle, Major A.

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## XXXiv List of Members of the Asiatic Society, 1845.

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Gladstone, Esq. M.

Goodwyn, Capt. H.

Ganthony, Esq. R.

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## ASIATIC SOCIETY.

Translation of the Toofut ul Kiram, a History of Sindh. By.

Lieut. Postans.

[Continued from page 99.]

Account of the circumstances attending the death of Mahamed Bin Cassim.

Thus, when the two daughters of Dahir, Purmul Deo and Suruj Deo, who were on the howdah with him, arrived for the service of the Khalif, he saw that they were extremely beautiful, and appropriated them to himself; still, in order to dissipate their shyness and distress, he committed them to the care of the keepers of the Harem, and after a time called one to his bed. Now since the death of their father had sorely afflicted them, she said, "I am not for the Khalif, for Mahamed Cassim took me to himself for three nights." The Khalif on hearing this was enraged, and at once wrote an order himself and despatched it, to the intent, that on seeing that order, he, Mahamed Cassim, should cause himself to be enclosed in a raw hide and sent to the presence of the Khalif. This order was received by Mahamed Bin Cassim at Yassur: sufficient was it that the order was from the potentate, to which there is but obedience; he was sewed up in a raw hide and sent off: on the third day he died; they put his body in a box and took it to the Khalif, who immediately called the two women and said, "See how absolute is my power." They laughed and said, "In the accomplishment of the wish of the Khalif there is no wavering; but in justice and wisdom there is neither foresight or discrimination, seeing the man, who treated us as if he were our father and brother, on our

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simple words, longing as we do for revenge, without enquiry into the truth or falsehood, has been destroyed: our wish was retribution for our father's death. Mahamed Cassim moreover was deficient in wisdom; he should according to the order have started on his journey, but have delivered himself from the hide after one day, and have arrived alive: we have undoubtedly told the truth in our evidence, and we resign our lives." The Khalif was ashamed, and ordered them to be tied to the foot of an elephant and dragged through the bazar and burnt.

The Khalifs of Bini Oomai and their Deputies.

After the conquest of Sindh by Bin Cassim, according to what has Deputies of the Kha- been related, Harraf Bin Keiss Bin Rawah Assadi lifs of Bini Oomai. \_\_\_ remained in charge of Alor, and the individuals before mentioned were governors as appointed. After them the people of Hind became rebellious, and from the confines of Dibalpur to the sea, remained in the hands of the Moslem deputies. After a time Abu Hifaz, Bin Kutibah, Bin Mussilim arrived from Hijjoj, and punished those who had not embraced the true faith: the (Hindoo) deputies being helpless, fled to Khorassan. About that time Jamin Bin Zeid also arrived from Hijjaj, and on the part of the Khalif Suliman Amin Bin Abdullah, openly obtained the government of Sindh; and in the year 100 H. Oomur Bin Abdul Aziz, Bin Umeer, Bin Muslim came to conquer Hind. He took some of those countries, and made some of the tribes of Sindh Mahomedans; but in the time of the Khalif Hasham, they seceded. Suliman Bin Hashan, as is related in the first vol., fled from the army of Mirwan and came to Sindh, where, intent on rebellion, he remained until Saffah obtained the Khalifat; he then embraced the service of Saffah: also Abul Khitab arrived on the part of Mirwan.

The period of the government of the deputies of the Khalifs of Bini

Oomai extended from the year 93 until 133 H. All
The authority of the this period from the commencement of the 93 H.
Khalifs of Bini Oomai over Sindh extends to until the period mentioned, is 40 years. Since the the year 133 H., for a period of 40 years. government of the deputies of the Khalifat of the

house of Bini Oomai was as described, now it is neces-

sary to relate the government of the deputies of Bini Abbas. Still there are a few circumstances connected with this period which must be related, and which I shall compress as briefly as may be.

Let it not be concealed, that when the deputies of Bini Oomai took Sindh, some of the dependencies of the country were yet disobedient to the great authority (of the Khalifs.) In short, Dihi Rahi, descended from the Rahis, was in the city of Dihir a place of renown, and Bimhul Rahi was at Bhunbur, which city he had founded.

Account of the Deputies of the Khalifs of Bini Abbas.

When Saffah, who was the first Khalif of Bini Abbas, came to the throne, in the year 133 H., he sent a force under Da'ud Bin Alli, and the government of Sindh was taken from the deputies of Bini Oomai. After four years Abu Joffir Mimsur Abbasi, ordered and prepared an army for Sindh and Hindoostan: in the time of Harun Reshid, Moussa the brother of Fazil came from Mecca to the governorship of Sindh, but, giving away all he obtained, he was dismissed. Alli Bin Isa, Bin Haman came in his place; at this time the fort of Tibm, an impregnable fortification near Sahurah and the city of Bakar, and other places in that vicinity, westerly from Sindh, were in the hands of Sheikh Abdul Tihrah, whose tomb with those of other holy men (martyrs) are still places of pilgrimage to true believers, and on the top of the dome it is written, that he died in the year 171 H. The city of Bhunbur having been destroyed, they proceeded elsewhere. At length Abul Abbas arrived as governor of Sindh, and remained there a long period. In the time of Mam'on, some further portions of Hind were added to the possessions of their deputies. After him, other individuals were appointed from Bagdad to the governorship of Sindh, until during the Khalifat of Abdul Kadir Billah al Abbas, when Abmed Assak, Bin Ahmukhtidar Allah, was appointed. In the middle of the month

Ramzan 416 H., Sultan Mahmud Ghazi arrived at 416 H., 1025 A. D. Multan from Ghuzni, and having captured Ooch, takes possession of drove out the deputies of Abdul Kadir from the counthe authority of the try of Sindh. The period of the government of the deputies of the Khalifs of Bini Abbas, from the com-

mencement before mentioned is altogether 283 years.

The tribe of Sumrah had 200 years previously taken possession of certain portions of Sindh, but as they had paid tax and tribute, and had Tribe of Sumrah to be been obedient to the Moslem governors, no mention described hereafter. has been made of them: but after having related the

dynasty of the deputies of Ghuzni, and considered the emperors of Delhi, we will relate the rule of some of the above-mentioned tribe.

List of the Deputies of Ghuzni, and narrative of the Emperor of Delhi. As before mentioned, Abdul Rizak the minister of Sultan Mahmud Ghuzni deputies. Ghazi, in the year 417 H. having taken Bukkur, arrived at Sewistan and Tattah, and the governors of Bini Oomai and Bini Abbas had not remained there, except a small portion who had formed connections, and were encumbered with families: they were men of note, and received stipends from the government.

From amongst these were 18 families, the heads of generations. Distinguished heads Briefly: the Sukufis, a family of Cazis originally of Bakar and Alor, from the descendants of Mussa Bin Yakub, Bin Tahi, Bin Mahamed, Bin Shiban, Bin Ushman Sukufi who, with the Cazi Ismail, Bin Alli, Bin Mussa, Bin Tahi were the first relaters of the conquest of Sindh in Arabia, and their great grand-father Mussa Bin Yakub, was confirmed by Bin Cassim as Cazi of Alor after the conquest of that fort: and the " Tamims" and " Hal Mogheirahs," (which term became slightly changed to Hal Tuhim and Ibn Soriah,) and the Abbasis and Sadiks, Farukians and Ooshmamans, who up to this present time are to be found in all Sindh; and the Phonwarans descended from Haris and the tribe of Mungi, a branch of the Tamins, the family of Jubiriah, of whom Sheikh Tahi in the account of Hullani will be mentioned; and the family of Bini Assad, of whom is Sheikh Mirtah, will be alluded to at Futtipur; the family of Hal Hutbeh of whom is Cazi Bahran, he also will be referred to at Futtipur; the family of Benwabi Sufian, of whom are some durveshes of Rahib; the family of the tribe of Bajur, governor near Jehanker, the descendants of Jaremah Jusari, of whom is the tribe of Sapiah, who are the possessors of Sewistan; and the Jhutts and Beloochees are originally from Harun Mikrani, and it will be more convenient to relate the genealogies of the Beloochees and Jhutts without delay.

## Origin of the Jhutts and Beloochees.

Mahamed Bin Harun Mikrani, who has been mentioned in the account of the officers of Mikran, and who came with Mahamed Cassim at the time of the conquest of Sindh as far as Armanbihah, where he died and was buried, is the son of Mahamed Haban, Bin Abdul Rahim, Bin Hamzeh, Bin Abdul Mathab. Once, when Meer Hamzah (may God approve him) went out to hunt in a country far in the desert, he became alone there, and, according to the favour of the Most High who is always propitious to good and great men, a good genius or fairy appeared to keep him company; by the Divine will he embraced her, and she became hidden from his sight: afterwards she brought forth Abdul Rahim.

In short, Mahamed Bin Harun had fifty-two sons by seven wives. Thus, one: Isa, Mikran, Hijaz, Satak, Bikram, Rustum, and Jillah from one mother named Hamira; Zumal, Mazid, Radah, Buhlal, Shahbab, Nizam, Julal, Marid, from one mother named Hamiri; Roedin, Mussa, Noki, Noh, Mundah, Raza-al-din, from Miriam; Jullal from Hashiat; Adam, Kumal, Ahmed, Humad, Hamud Said, Masud, from Musma, ; Mudi, Shir, Koh, Babund, Kark, Nowar al din, Hussan, Hasein, Suliman, and Abrahim, from Fatimah; Alim, Alli, Tirkush, Buhpad, Teghzan, Mubarik, Túrk, Tallah, Arbi, Shiraz. Tajal-deen, Takht, Gulistan, and Burk from Khwah. When, according to the order of Hijjaj as related, Mikran was cleared, that land with others was appointed into two shares, and one share was given to the descendants of Jallal al deen, and they came to Sowah and Kich,\* and their descendants are to this day scattered in great numbers all over Sindh. The tribe of Lodah also called Lulian, have their origin thus. The illustrious Suliman sent familiar spirits in the shape of men to purchase slave girls at Rum. On their return, one of these had connection with one of the women; Suliman gave her to him, and a boy was born: afterwards his descendants mixed with the Arabs, and came to Sindh at the time of the conquest, or before.

Account of the origin of the tribe of Sumah.

The narrative of these people, as is necessary, will be fully told in the course of this history. Sam, who is said to have been the son of Amúr, the son of Sham Bin Abal Suhub, and again the son of Umar Bin Akrameh Bin Alu Jahul, or the son of Akrameh Bin Abul Hisam, Bin Abbu Jihil: there are, however, various reports, of which the following is the most consistent. That they were de-

scended from Jamshid, whence they took the title of "Jam," with which they were distinguished; or else they were from Sam the son of Noh: he had four sons, the first Budha, (his descendants were Budh, Sodah, Sittah, Ahkil, Ootah, Amiah, Hazir, and in short there were sixteen sons generally known by the title of Rathur,) and the second Sankah, the third Hami, and the fourth Bhakirat. This Bhakirat had a son called Dusrut. Now Dusrut had three wives, one named Kila, the second Kuliah, and the third Simah: from Kila there were two sons, one named Ram, the other Lukhman; from Kuliah one son Barat; and from Simah one son Chutur Kim. To Sunkah the son of Sam there were also descendants, and also to Hami; they were called Judur. Barat the son of Dusrut had descendants called Purhur, Janeipar, Gorijah, and Rahih Chatar Khan; the son of Dasrat had descendants, called Charah, Lukhman; son of Dasrat had no children; Ram had one son, who had a son called Tawahus, who had a son called Tatal, who had a son called Nirkanat; his son was called Kin, (the city of Kin\* is so called after him.) The son of Kin was entitled Sambat Rajah. Sambat Rajah had four children: 1, Sam Bir Kirarah, also called Sham; 2, Nihrat; 3, Dakhan; and 4, Madah. In short, Sam the son of Sambat Rajah, had a son called Jadim. Jadim had four sons: first, Habit whose descendants are the Sumahs of Sindh; the second Kajbit, whose descendants are the Chughdah; the third Buhobut, his descendants are the tribe of Bhati; the fourth Chira Sumah, of his descendants is Rahi Diach, the governor of Kurnal, a fort situated in the land of Soorteh: he became a martyr, and the tale of the love and devotion of his wife is well known. the son of Jadim, the son of Sam, the son of Sambat Rajah, had a son named Rubdari; he had a son called Mijat, he had Nootyah, he had Udha, he had Udheh, he had Lakyah, and he had Lakah. Lakah was a sovereign, and married into the Bhati tribe: he had four sons. Thus, first, Udhuh without children; Udhuh, which was his place of abode, is called after him. Second, Mahir, who had four sons: 1, Sitah; 2, Waditar Patheria; 3, Wirhah, without children; and 4, Sand, also without children. They say that the above-mentioned Lakah mar-

<sup>\* &</sup>quot;Kin and Kashmir," as they are called in Sindh, on the southern confines of the Seikh territories; they formerly belonged to Sindh, but now belong to Multan and the Seikh government.

ried again in his old age, and had four sons. First, Comur; second, Jeyur, (his descendants are Babrahs, Dukemehs, Kulah;) third, Phul Lakah\*, (the Philani are known as his descendants;) fourth, Munayah. Comur the son of Lakah had a son named Lakah; he had a son named Sumah, who had two sons, one named Kakah, and the other Jihrah. Kakah became a ruler, (the place called Kakah is so called after him;) he had two sons, one Palli and the other Raydin, from the descendants of Palli. Musruk Sumah became a governor, and Raydin had nine sons. Thus: first, Sumal, the Samijahs are his descendants; second, Notyar, all the Nouts are his descendants; third, Lakah, his descendants are Lanjar, Mukdoom, Sihar, Lanjar, (God's mercy be on him) of whom mention will be made in the account of the Sheikhs, belongs to him; fourth, Abrah, whose descendants are Daod, Zahir Nayah and Fal Nayah; fifth, Nayah; sixth, Chamir; seventh, Munhayah; eighth, Koriah (the descendants of these three last tribes are the Mundrah;) ninth, Palli who was a chief and had two sons, first Oodah, whose descendants are the Bariah Oodejah (also called Gordrah Putrah,) and second Saud, who was the chief of the tribe. Saud the son of Palli had seven sons: first, Kakah, whose descendants are the Kakejah Putrah; second, Jarah, who had descendants the Jahiejahs; third, Waderah; fourth \*\*\*; fifth, Hingarah, his descendants are Hodejah, Juksia, Wurha and Hingoja; sixth, Dirah, his descendants are Dirah Sumah in Cutch; seventh, Jam Hoti, who had five sons; first, Halah, his descendants are known as the Halah; second, Hingorah, his descendants are Bumian, Ruhuriah, Hingorah, and they founded the places thus mentioned; third, Sahi, his descendants are Sahir Sumah; fourth, Chalidriah, his descendants are well known as Nihirah; fifth, Jam Hapur, who had two sons; first Raojah, second Jam Jumur, who had a son Kirraha; he had three sons: first, Saudh, whose descendants are Raoma, Lakayat and Jehrah; second, Sumrah, who had no children; third, Lakah Jan, who had one son Kalah, who had a son called Lekah; after whose death he had another called Brekanah, he took the name of his father. Lakah Bin Kahah, the brother of Nahah, had twelve sons: thus, first, Jam Jumur, from whom are descendants the Sumahs, the rulers of Sindh residents of Sanuir, who will be mentioned

<sup>\* &</sup>quot;Laka Philani," an heroic Rajpút prince, well known in Cutch traditions; the Jhareejahs of Cutch date their origin from the Sumahs of Sind, (see Mrs. Postans's "Cutch," or the traditions of "Laka Philani."



in their proper places; second, Comur, who ruled in Buhriah, he had no children; third, Palli, whose descendants are Palli Sumah; fourth, Kahah, his descendants are Sodiari Sumah; fifth, Hoteh, his descendants are Sahib Sumah, Hoteh Sumah, and Sekawutteh Sumah; sixth, Jeysur (or Jeyur,) whose descendants are the Beyah Purya; seventh, Mangur, without children; eighth, Abrah, whose descendants are the tribe of Abrejahs; ninth, Hingorah Konur; tenth, Sultan; eleventh, Rayidam; twelfth, Lakah. In short, Hingorah Konur had three sons: first, Deysur; second, Minayah; and third, Miradeyah. Deysur had five sons; Kah, Halah, Rukun, Hingorah, and Jonah. Jonah the son of Lakah, abovementioned, had five sons : first, Khoreah ; second, Tajiah ; third, Abrah ; fourth, Beloch; fifth, Babniah. The account of the descendants of Babniah, who ruled in Sindh, will be mentioned in the dynasty of the Sumahs.

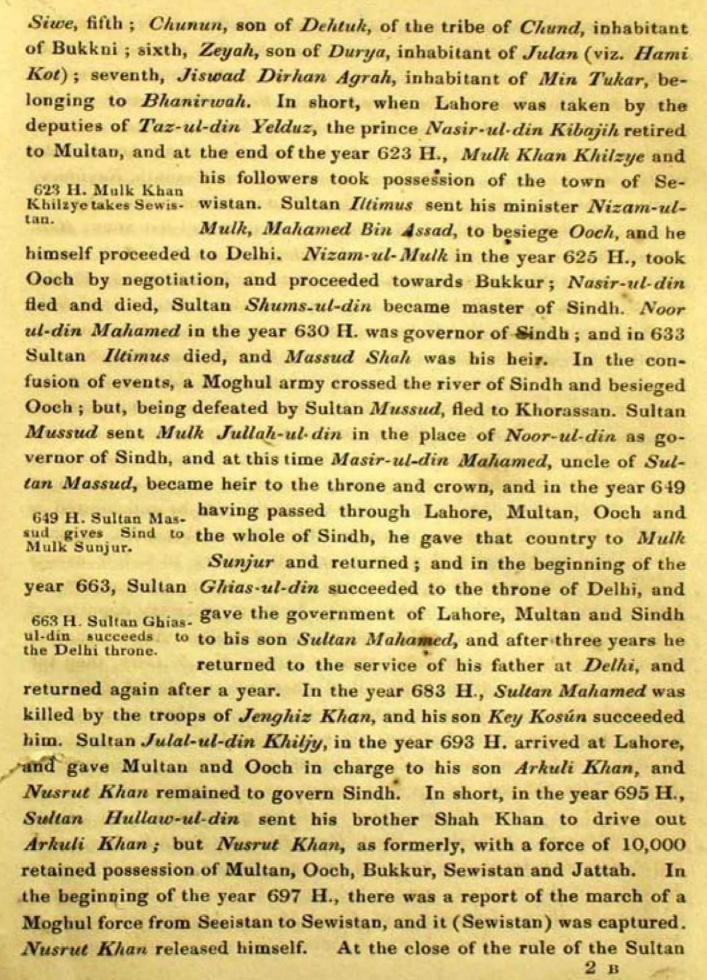
Let it not be concealed, that according to what has been related,

Sumahs are the prin-Sindh and Guzerat, (i. e. Cutch.)

the descendants of Sumah are to this day the principal inhabitants of cipal natives of the countries of Sindh and Guzerat, and Sindh was previously cultivated and inhabited by them. Besides this tribe, the Jhutts and Beloo-

chees and the descendants of others as alluded to, were from the older time inhabitants of that country: others might also be enumerated in addition to these, but since it was not intended in this work to make other than an abbreviated account, and to adhere to a few events which are most interesting, if any one should require further particulars let him look for them (elsewhere.) In short, after the deputies of Sultan Mahmud, those of Sultan Masud, Sultan Modud, then of Sultan Mahdud, then of Sultan Kutub Aldin, then the deputies of Sultan Aram Shah, all of whom are mentioned in the 1st and 2nd vols. as connected with Sindh, came to that country, and during the time of the Sultanut, it was divided into four portions; Multan, Ooch, and the whole of Sindh fell to the government of Nasir Uldin Sibajah, and at that period seven Rajahs in Sindh from

Seven Rajahs pay the places which shall be mentioned, paid tribute to Multan. First, Rana Bhansur Satah Rathur, residing at Zihrah, belonging to Dirpilah; second, Rana Sami, son of Dimach Kirecheh of the tribe of Sumah, belonging to Turk in the territories of Rupah; third, Jeysar, son of Hijah Machee Solanki, inhabitant of Maunktan; fourth, Wakijah, son of Panun Chunun, belonging to Dirah



CINTRAL LISPARY

Hillaw-ul-din, Ghazi Mulk was sent with 10,000 Sowars to Dibalpur to drive out the Moghuls of Jenghiz Khan. Multan, Ooch, and Sindh were made over to him as a jahgir, but in the revolution of events Kosún Khan usurped the throne from his father. Ghazi Mulk taking the army of Multan, Ooch and Sindh, overthrew Kosún Khan and took the throne, and he was styled Sultan Ghias-ul-din. At this time the The tribe of Summer of Sumrah came forth and took possession of rah take possession of Jattah. Sultan Ghias-ul-din sent Mulk Jaj-ul-din to Jattah.

Multan, Kwajeh Khatria to Bukkur, and Mulk Haleshir to Sewistan. After a time when Mulk Kush-koo-Khan became rebellious in Multan, Sultan Mahamed Shah, the son of Sultan Ghiasul-din, in the year 723 H., came to Multan and subdued him; then having placed considertial servants at Bukkur and Sewistan, he returned. 751 H. Jaghi Ghal. In the year 751 H., Jaghi Ghullam having arrived laminvades Sindh. at Jattah from Gujrat, Kach, and other places, pitched at Jahir on the edge of the river; but being annoyed with fever, he marched from thence and came to Kandul, where he recovered, and

pitched at Jahir on the edge of the river; but being annoyed with fever, he marched from thence and came to Kandul, where he recovered, and returned to Jattah; from which he remained and surrounded Jattah on four sides, but he died of the same complaint as above-mentioned. Sultan Feiroz Shah then possessed the throne. Jaghi was at Jattah,

The Sumrahs and Jharijahs defeat Feiroz Shah at Jattah.

The Sultan in the heginning of the month of Safar of

The Sultan in the beginning of the month of Safar of the above year, marched from the neighbourhood of Jattah on the river Sankrah; he directed a fort to be built. Ami Nasur remained there with 1000 horse; he built a city called Nusurpur, and he appointed Mulk Bihram, chief magistrate in those districts; he built Bihrampore, and Mulk Allishir and Mulk Jaj Kafuri were left at Sewistan as governors. He then proceeded to Bukkur. Mulk Kuknahdin and Mulk Abadul Aziz were appointed Naib and Dewan, with a party of trusty men as guardians of the fort; and Mulk Kuku-ul-din had the title conferred on him of Ikhlas Jani, and was made governor of all the country of Sindh. The Sultan then returned to Delhi. After this, in the year 773 H. having determined to take Nuggur Kot, he came to

773 H. Sultan Fei- Jattah; Jam Kheir-ul-din, the governor of Jattah, deroz Shah comes again fended himself in the fort, surrounded by water, and to Jattah. the Sultan by reason of the want of grain and the



abundance of musquitoes, returned to Jattah. Jam Kheir-ul-din being promised pardon, proferred his service; he took with him all the zumeendars to Delhi, but when they reached Sehwan it was discovered that the Jam meditated escape; he was chained and imprisoned. After a time Jam Junur, son of Jam Kheir-ul-din, was invested with the governorship of Jattah, and in the year 790 H. Feiroz Shah died, and Sultan Jughluk Shah succeeded him; after him, Sultan Abu Bukur, then Sultan Mahamed Shah, then Feiroz Shah. Sultan Sikundur Shah, then Sultan Nasir-ul-din, came to the throne of Delhi: he sent Sazang Khan to take possession of Dibalpur, Multan and Sindh; and in the year 800 H., Mirza Pir Mahamed Nezah, a noble of Timúrs, crossed the river of Sindh, and invested the fort of Ooch. Mulk Alli, who on the part of Sazang Khan was in that place, resisted for a month. Sazang Khan sent Jaj-ul-din Khan with 4000 men to assist him; he released Mirza Pir Mahamed, and defeated Sazang Khan: he invested Multan, and after six months Sazang Khan became obedient and delivered up Multan. At this time Sahib Karan in the year 801 H. descended on Multan: from this period the Sultans of Delhi lost 801 H. The power of dominion in Sindh over the governors in that country, the Delhi sovereigns who themselves obtained power. in Sindh decline.

## The Tribe of Sumrah.

Some of this tribe ruled in parts of Sindb, as has been mentioned, previous to this. Thus the whole time that their authority extended was 550 years; and therefore, after the descendants of Jamim, the last of the deputies of Bini Abbas, seeing their power, the narrators of history began to make mention of them; at that time, as will be mentioned, the government of Sindh passed to the Ghoris and Ghuzniris, and this tribe of itself became powerful, as will be related.

And now the origin of this tribe is not clearly traced; but they origin of Sumrahs obscure.

Origin of Sumrahs they are apparently connected with the descendants of "Sindh." In short, according to what has been previously related, when in the year of 720 H. Ghazi Mulk collected the army of Sindh



and Multan, and took it to Delhi and subdued Khosrow Khan, he succeeded to the throne; and Sultan Ghias-ul-din, Jughluk Shah was his How they acquir- title: whilst he was occupied with affairs in that quarter, the men of Súmrah collected from the vicinity of Jhuri and placed a man named Surmah in the governor's seat, and, having possessed the country, he espoused the daughter of a zumeendar named Saud, who was of power and rank: by her he had a son, named Bangur Khan. Sumrah died, Bangur succeeded him, and his son Dodah took possession of the country to Nusurpur; he had a son named Sungar, a minor, and the government of the country came to Jaree, daughter of Dodah; and when Sungur became of years he succeeded to the governorship, and proceeded towards Cutch and subdued the country to the river Manak. As he had no children, his wife Heimus' brother was appointed governor of the city of Toor and Thurri. After a short time Dodah Sumrah, who was governor in the fort of Dakah, collected his tribe from the surrounding country, and extirpated the brother of Heimus. At this time Dodu and Phatu, descendants of Dodah, came out with a large force, and gave him the chieftainship; he ruled for some time, and after him Kheira took possession of the country; then Armil succeeded to it, but being an oppressor, the men of Sumah collected and killed him; this was in the year 752 H.: but the beginning and end of this tribe as rulers is by others otherwise related. Thus in the Muntukhib al Juwarikh, when Sultan Abdul Rashid, Bin Sultan Mahamed Ghazi, succeeded to the throne, his imbecility caused the inhabitants of Sindh to be rebellious, and in the year 445 H. the men of Sumrah collected near Thurri, and placed a per-

rahs placed Sumrah on the musnud.

Descendants Sumrah.

445 H. The Sum- son named Sumrah in the governship. Sumrah possessed his elevation for a long period, and had a son Bangur by the daughter of a zumeendar named Saud, and died. Bangur Bin Sumrah ruled for 15 years; in

the year 461 H. he died: after him Dodah Bin Bangur governed for 24 years, and in the H. 485 he died. After him Sungar for 15 years; after him Hufif 36 years; after him Comur 40 years; Dodah the second 14 years; Phutto 33 years; Kheysurah Dodah third 14 years; Jahi 24 years; Chami 18 years; Bangur second 15 years; Hafif the second 18 years; Dodah the fourth 25 years; Oomur the second 35 years; Bangur third 10 years: after him Hamir succeeded to the govern-



The Sumahs overment, but being a tyrant, the tribe of Sumah overthrew the Sumrahs. threw him, which will be mentioned in the course of the history of that tribe. Oomur Sumrah founded the fort of Oomur Kot; Dilu Rahi, son of Dilu Rahi before-mentioned, governor of Dilu, was a tyrant and given to infamous practices: to his tyranny and oppression is ascribed the destruction of Alor.

## Account of the destruction of the City of Alor.

It was a custom of that unjust tyrant to take half the property of every merchant who arrived from Hind as duty Legend of the destruc-tion of Alor, through the tyranny of Dilu A wealthy and influential merchant who had the title of Seif-ul-Mulk, and a few other princes with him dressed as merchants, but who were on pilgrimage to Mecca, being ignorant of that villain's proceedings, entered his capital: the merchant had with him a beautiful woman named Budeh-al-Jumal; at that time the river Mihran ran close to Alor. Hearing of the beauty of Budeh-al-Jumal, Dilu Rahi became anxious to possess her, and wished to arrest the merchant under the pretence of his intending to smuggle his goods. The unfortunate merchant for three days tried to persuade the tyrant, and vented his complaints mightily to the Most High; and as the supplications of the afflicted are accepted, he was inspired with a dream, that in the morning he should conceal himself, and taking a party of stone-cutters famous as Firhad, and having bribed them well, during the following night cut a passage through the hills for the passage of the river, large enough for a boat, and on the other side erect a strong embankment. Although both these appeared impossible tasks, yet by the help of the Almighty they were accomplished. The merchant with his boats passed safely by that road; and the river Mihran, quitting its former passage, took the course which it now takes. In the morning the people told Dilu Rahi, but all his efforts to repair the calamity were unavailing against the decree of fate. The ruin of Alor is dated to have commenced from that day. They say that Seif-ul-Mulk with his beloved Budeh-ul-Jumal, when they returned from the pilgrimage to the Kaabah, arrived and lived in the country between Derah Ghazi Khan and Sitpur and died. Budeh-ul-Jumal had two sons, Jah and Chatah; until now her tomb with those of her two sons, are places of pilgrimage.



Account of the decline of the City of Bhunbur, generally known as Brahmanabad.

They relate, that Dilu Rahi after the ruin of the city of Alor came to the latter place to reside; he had a brother Chotele Legend of the de-Oomrani: in his youth he had been blessed with cline of Brahmanabad. the true belief, so that leaving that city he had studied and learnt the Koran, and performed the duties enjoined by his religion sedulously. When he returned to the city, his relations pressed upon him the acceptance of the governorship, but he would not accept it : some one jokingly observed, " This Turk has been to the Kaabah, and married the daughter of a certain Arab." By chance in those his younger days he became anxious to perform the Haj; and when he arrived there, he one day saw a woman in a shop occupied in repeating the Koran : he staid to listen. She asked him, why he staid? He said, to hear the Koran. " If you will teach me to read, I will be your slave." The woman said, " My instructor is the daughter of a certain person; if you will disguise yourself as a woman and come with me, I will take you to her." In short, in this way he was taken there, and became occupied in reading and meditating on the Koran. It appears, that his instructress was skilled in astrology: one day the woman came to her, and asked after the fortune of Choteh in disguise; she said he would be a governor or chief. Choteh said, "Since you know the fortune of others, can you tell any thing of your own?" The girl said, "You are right; I shall wed with some one who is an inhabitant of Sindh." They asked her, who it was? she said to Choteb, "You are the man." In short, concealment was at an end; the girl instructed him after this to go and change his garments, and to demand her in marriage as she was destined for him; she then communicated the case to her parents, and was shortly afterwards married to Chotch. He after a time returned to his own country, and took his wife, whose name was Fatimah, with him : when he arrived at the city of Dilu Rahi, that tyrant had made a practice of seizing newly-married women, and then releasing them. Chotch tried to dissuade him from this, but he would not desist, until one day he heard the praises of Fatimah. Whilst Chotch was from home, Dilu Rahi came to see her. Choteh suspected his intentions; coming quickly home, he took his wife and left the city, crying out, " This city through the wickedness of its



governor will be swallowed up this night; whoever wishes to escape from destruction, has now the opportunity of doing so." Some few believed him. On the first night the city escaped, in consequence of the watchfulness of an old woman at her wheel; on the second, from the working of an oil mill: at length, on the third night, the whole city with its inhabitants was swallowed up and destroyed, and one minaret, as an example and to record the fact, yet remains."

Account of the men of Sumrah taking possession of Cutch.

This tribe inhabited the country of Cutch, and the ruler of that province protected and encouraged them. After a The Sumrahs take time this tribe said, "We are strong and numerous, legend appertaining and we have lived safely under your shadow until we thereto.

become troublesome: now give us a portion of waste

land, so that we may cultivate it and pay tribute." The Rahi of Cutch with kindness gave them broad lands, and taxed them at 500 carts of grass from their crops. The tribe continued to pay the tax, and in a short time became acquainted with the manners and customs of the people and governors; they then determined amongst themselves to acquire possession of the country. Now at the gate of the fort occupied by the governor of Cutch, a brahmin and astrologer was placed, and he permitted all to pass in after he had inquired their business. This tribe had collected their 500 carts of grass, but in the grass of each cart they placed two armed men, and one drove the cart into the city; they say that when the carts came in, the brahmin said "there is the smell of flesh in these carts:" the door-keepers rejected his suspicions, and said. "What can there be in grass?" But some of those present thrust their spears into the grass. They say, that those in the carts wiped the blood of their bodies from the points of the spears, so that they should not be discovered. So the door-keepers accusing the brahmin of falsehood, allowed the carts to pass in, and thus the men took possession of the city, and overthrew the Rahi of Cutch, and became Chiefs of the country; until this time the descendants of the Sumrah are, in various

<sup>\*</sup> Brahmanabad must have been situated in the Lar, or delta division of Sindh; its site is not fixed.

ranks, the governors of Cutch.\* In short, when in consequence of Dilu Rahis's tyranny, the river Mihran flowed past Sewistan, and those lands which are now fertile became so; then the land of the men of Sumrah became unproductive, and from inflicting brands and the op-Fall of the tribe pressions of the before-mentioned tribe, complaints were sent to the Sultan, Hilaw-ul-din at Delhi; he of Sumrahs. sent his deputy and chief of his army Sular Khan, who coming upon the men of Sumrah, they sent their families in care of the tribe of Charuns, which tribe is highly respected by both parties, to Abrah Abranee Sumah, the governor of Cutch, and prepared to oppose the forces of the Sultan; these latter came upon them like the storm on a vessel-there was a great battle. The son of Sumrah, who was the Chief of all the forces of that tribe, was killed; the rest could not hold out in the city of Joor and fled to Cutch. The Sultan's troops pursued their wives and children to Cutch, and every night when they halted they threw a large ditch round the camp to prevent a night attack; and these ditches are still to be seen, and very deep. When they reached Cutch, Abrah Sumah attacked the Sumrahs in conjunction with the Sultan's troops. In short, after the fall of the tribe of Sumrah the tribe of Sumah became the possessors of those countries, and the city of tain power. Mahamed Joor was destroyed by the troops of the Shah; and the city of Samwa was founded, and other new districts cultivated. The country of the city of Joor, which is situated near the pur-

## The Dynasty of the Jams of Sumah.

gunnah of Darah, being through ill fortune abandoned, they founded

another Jooreh as shall be mentioned.

List of the Jams Jihul as has been mentioned; but according to what of Sumah.

Origin of the Sumahs.

and the account of it is given by Meer Massum in the "Chach Nameh."

Thus, the descendants of Akrumeh about the year 93 H. the whole of this tribe entered the Mahomedan faith, and collected together from distant places in this country, and Akrumeh at or near

<sup>\*</sup> The ruins of Goomtee in Cutch are in the traditions of that country, the scene of the exploit of the Sumrahs.

that time was a governor, and he is connected with Sam Bin Oomur, Bin Hassan, Bin Abi Luhab, but I do doubt if this is correct.

They are also said to be descended from Jam-shid; hence their title of " Jam," and this appears the most probable. Reason of their taking the title of From some great man it is related, that they are de-Jam, and their name scendants of Sam Bin Noh, and thus they are styled Sumah or Samah. Sumah. God knows.

- 1. Jam Oonur Bin Babineh. When they were released from oppression of the tribe of Sumrah, the men of Sumah, who 1. Jam Oonur. before were cultivators of gardens, collected and styled him " Jam ;" they constituted him chief and leader. It was thus in the year 752 H., and in a short time this Jam obtained complete power; Mulk Ruttun overthrew the remainder of the Turks, who were governors in Sewistan, and after three years and six months, he died. They relate also, that Kahah Bin Tamachi his vakeel, brought Ferroz and Alli Shah from Bukkur to Birhampur, where they killed him; and after three days the men of Oonur killed Mulk Ferroz.
- 2. Jam Junur Bin Babineh succeeded his brother; he crossed over from Tulhati, and ravaged and pillaged the towns and villages; he left Bukkur in charge of the Türks; after this he became powerful in Sindh, until Sultan Hullaw-ul-din sent his brother Alif Khan to Multan and its dependencies; Mulk Taj Kuffuri and Tatar Khan were sent to Sindh to oppose Jam Junur; previous to that Jam Junur had died: his reign extended for 13 or 14 years. The Shah's army took Bukkur, and looked towards Sehwan. After Jam Junur,
- 3. Jam Tamachi Bin Jam Oonur succeeded to the seat of government; 3. Jam Tamachi. the Sultan's army took him and his family prisoners to Delhi. The tribe of Sumah went to Thurri, and for 15 years, 4. Jam Babineh Bin Jam Oonur ruled over them, according to the account of Meer Massum. 5. Jam Kheir-ul-din, son of Tamachi, after the death of his father (according to the order of the Shah) came from Delhi to Sindh, and took possession. Sultan Mahamed Shah, pursuing Taghi Ghullam as before mentioned, arrived in the vicinity of Tattah and died, and Sultan Ferroz succeeded him. went to Delhi; Jam Kheir-ul-din pursued him to the territories of Sin; after some engagements returned, ruled his subjects justly, and in peace. After Kheir-ul-din, his son, 6. Jam Babineh second, suc-



ceeded him; Sultan Ferroz Shah came over, but returned, and coming again took him prisoner. After a time when he had experienced his services he conferred the government of Sindh upon him, and he ruled for 15 years and died: he founded the city of Samwi; some say it was founded by Payeh Bin Oomur, but this is 7. Jam Tamachi wrong. 7. Jam Tamachi second, his brother, succeeded, and ruled peaceably for 13 years: then his son, 8. Jam Sullah-ul-din. 8. Jam Sullah-ul-din, who after settling his own country proceeded to Cutch, and returned victorious: after 11 years he died.

In the praise of Sheikh Himar Jumali (may God's mercy be towards him) it is written, that Jam Junur sent Jam Tamachi and his son Jam Sullah-ul-din to Delhi, and they being released by the Sheikh abovementioned from Hind returned to Sindh, and overthrew Junur, taking possession of the country; first the father, and then the son ruled: but this differs with the first account of Meer Mussum. But God knows.

9. Jam Nizam-ul-din. In short, after Sullah-ul-din, Jam Nizam-ul-din succeeded to the government, and released his uncles.

The Editors at first hesitated to publish this article, fearing that their readers might consider it almost a reprint, or an amplification of the former paper by the same author, "On the early history of Scinde from the 'Chuch Namah,' &c.," as it in fact at first sight appears to be. But Lieut. Postans himself in his introduction has, they conceive, assigned the best reason why it should not, even at the risk of some repetition, remain unpublished, namely, that "the author of the Toofut ul Kiram has collected his materials from the best authorities." And this is of more importance than it at first sight appears to be, for it implies that the author, who like our own early chroniclers was living in part of the times of his own history, was like them also near enough to the epochs embraced in it to exercise his discretion in the choice of the matters to be chronicled; and this doubtless founded on research amongst documents, and histories, and men now long passed away and numbered with



the dead. And the known customs of the Oriental writers of history, of publishing their works only after reading them to circles of the learned, would have furnished him with many facts, illustrations and corrections, which oral tradition had brought down, and which the stores of written knowledge then undoubtedly existing at all the courts of the Kalifat probably contained.

Our readers will thus, we hope, agree with them in their judgment that, as an historical reference, this translation is alike curious and useful, and they could not have given it otherwise than by printing it entire.

EDS.

Notices and Descriptions of various New or Little Known species of Birds, by Ed. Blyth, Curator of the Asiatic Society's Museum.

Nisaëtus alboniger, nobis. A smaller species than either of those of India, measuring about twenty-one inches and a half in length, wing thirteen inches, and tail nine and a half; tarse three inches: occipital crest three inches and a quarter. Adult black above, with a purple gloss, the large alars embrowned and distantly banded with black; tail black, with a broad light greyish-brown bar, occupying about its third quarter from the base; the longer upper tail-coverts have each two cross-bands of the same; lower parts pure white, with black mesial line on throat, large intense black drops on the breast, and the belly, vent, lower tail-coverts, tibial plumes, and short tarsal feathers, are throughout closely barred black and white: beak black; and toes waxyellow. A younger specimen has the drops fewer and smaller on the breast, an admixture of rufous about the head, several unmoulted brown feathers among the wing-coverts, and one unmoulted tailfeather has three narrowish dark bars, with two more at base closer and less defined. A remarkably handsome species, from Malacca.

Of the four Indian species of this genus, N. alboniger approaches nearest to N. cirratus, (Ray, Shaw,) v. Falco cristatellus, Tem.; and I doubt whether either of these becomes wholly black with age, like

the N. caligatus, (? Raffles), v. F. niveus (!), Tem., v. nipalensis, Hodgson\*, &c. a change, too, which would seem to obtain in the Astur melanoleucos figured in Dr. A. Smith's 'South African Zoology,' and which converts the Archibuteo lagopus into the Falco Sancti Johannis of the earlier systematists. A South African species of Nisaëtus exists in the " Aquila coronata," also figured by Dr. A. Smith, in which, if that naturalist be correct, the progressive change of colouring is from light to dark; but his alleged adult is so like the young of the Indian N. caligatus in its first dress, that I suspect the changes will be found analogous in the two species. It may be further remarked that the Aquila bellicosa, (Daud.) A. Smith, v. Falco armiger, Shaw, pertains to a very distinct and long-winged form, exemplified also by the Indian Aq. Bonellii, v. Nisaëtus grandis of Hodgson; and in this group, which may be distinguished by the name Eutolmaëtus, the adults only exhibit white under parts: whilst in another aquiline form which may bear the name of Butaëtus, exemplified by the Falco pennatus, Gm., v. Spizaëtus milvoides of Jerdon, the reverse change of colouring obtains, as in the ordinary Nisaëti. Indeed, a further approximation to the latter group is shewn by an occasional distinct, though slight, enlargement and elongation of the central occipital feathers, in fine adult examples of Butaëtus pennatus.

With respect to Nisaëtus cirratus, which is evidently the "Crested Indian Falcon" of Willoughby, I described two specimens in a note to Vol. XII. p. 306; and those I must now consider to be young or imperfectly mature: for the Society has since received a much finer adult from Capt. Robt. Shortrede, shot at Midnapore, having a pendent occipital crest consisting of twelve elongated feathers, the four longest measuring five inches and a half. In other respects, this species is not very strongly characterized apart from N. caligatus (apud nos,) but has the belly, flanks, and upper tail-coverts, much darker than usual in the corresponding state of plumage of that species, the head also being darker, and the throat more streaky; the dorsal feathers, however, are decidedly of a different form, being

<sup>·</sup> Mr. Hodgson's crested variety of his N. nipalensis refers to N. cirratus, since called by him N. pallidus .- E. B.

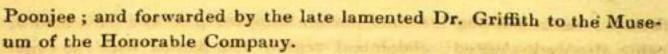
CONTRAL LIGHAM

much longer and narrower, instead of broad and rounded, a difference which is strongly marked on the lower interscapularies. Size the same. The splendid occipital crest is deep black, each feather tipped with white: upper parts empurpled hair-brown, the interscapularies, scapularies and tertiaries, more or less black, and the secondaries having distant dark bands; fore-neck and breast pure white, with a broad dark mesial streak to each feather; the belly, vent, flanks, and lower tail-coverts, dark brown; and thighs the same, a little freckled with whitish: tarsal feathers whitish, mottled with brown: head and neck fulvescent-brown, with mesial dark streaks; the usual three dark lines on the throat somewhat ill defined: tail as in N. caligatus, but less dashed with ashy.

This species seems to be peculiar to the hill districts of India, inhabiting alike the sub-Himalayan region, and the hilly parts of Central and Southern India. Mr. Elliot describes it to "sit on the tops of the highest trees, on the watch for hares, pea-fowl, and jungle-fowl, on which it swoops from its elevated perch. Solitary. Shot in the Rampoor jungle, inland from Nellore, at the foot of the Eastern Ghats." Mr. Jerdon and Lord Arthur Hay have since procured specimens from the same locality. The crest-feathers of this bird are not only longer and more copious than in either of the other species, but are of a more lax texture, so that when elevated they curve and droop backward, instead of remaining up straight. N. caligatus alone has invariably but a mere indication of this occipital crest, which is well developed in all the rest.

The other Indian species of Nisaëtus are N. pulcher, J. A. S. xii, 305; and N. Kienerii, (de Sparre), v. Spizaëtus albogularis, J. A. S. xi, 456.\* The following description was taken from what I conceive to have been an adult male of the former, in fully mature plumage. Length of wing seventeen inches and a half, and of tail thirteen inches. Old crest-feather measuring four inches and three-quarters, and new ones growing, which would apparently have been considerably longer. Plumage very Hawk-like: upper parts hair-brown, the exposed terminal portion of the feathers darker and purple-glossed; wing-coverts banded with white; throat with the usual three striæ, and the under parts light brown, transversely rayed with white, the colour darkening towards the white, and upon the tibial plumes. Received from Cherra-

<sup>\*</sup> The latter has since been received from Darjeeling.



Of the Spizäetus rufitinctus, McClelland and Horsfield, Proc. Zool. Soc. 1839, p. 153, Mr. Strickland informs me, that "Dr. Horsfield now classes this as a Limnaëtus, and it seems only to differ in having the lower half of the tarsus bare and scutate. The beak has a lateral undulation. Wing ten inches and a quarter, and tail eight inches. Fourth and fifth quills equal and longest. The breast is barred brown and white, the bars and their intervals being each about a quarter of an inch wide, and on the thighs about an eighth of an inch wide. The feathers of the breast have two brown bars on each. Tail with four light and four darker brown bars." As this is one of the very few Indian Raptores still wanting to the Society's museum, I shall also quote the original notice of it, as follows :- " Upper part of the body dark brown, with slight undulations of a deeper tint; breast and throat longitudinally striped with brown: belly and under surface of the wings white, transversely barred with brown : tarse feathered to the lower third, each feather marked with fine transverse bars; the rest shielded: the beak short, much hooked, and sharp: claws and toes strong and formidable.

"It inhabits the banks of the Boorampooter and other rivers in Assam, where it conceals itself in bushes and grass, along the verge of the water, seizing such fishes as approach the surface within its reach." This is also said to be the habit of the large naked-legged Owls which constitute the genus Ketupa.

Another species wanting to the Society's museum, and also distinguished by partially feathered tarse, may be described as

Buteo aquilinus, Hodgson. Length (of apparently a young female) about twenty-six inches, of which the tail measures eleven and a half; wing eighteen inches and a quarter; beak to forehead (in a straight line,) one and a half, and two inches and one-eighth to gape; tarse three and one-eighth, and plumed anteriorly for an inch and three-quarters. General colour hair-brown, the feathers edged with dull rufescent-brown, and their white bases shewing conspicuously about the nape; ear-coverts and sides of the head white, more or less dark-shafted; throat white, streaked with brown, the fore-neck coloured like the back, and the breast white for the greater portion of each



feather; the remaining terminal portion mingled pale and dark brown, being also dark-shafted; abdominal region and flanks, with the tibial plumes, dark brown, slightly rufous-edged towards the breast, and the axillaries more vividly rufescent; fore part of the under surface of the wing dusky-brown, the primaries freckled white beneath, except beyond their emargination where they become blackish; tail mottled with numerous dark bars, alternate on the two shafts of each feather, upon an albescent ground. Bill dark, as is apparently the cere: the toes appear to have been wax-yellow.

This bird might be mistaken, on a cursory view, for a variety of B. canescens, J. A. S. xii, 308, were it not for its half-feathered tarsi; and the beak also is larger and more aquiline, so that the name is felicitously bestowed. It is by no means a common species in Nepal, as I learned from Mr. Hodgson's people, and as might be inferred from the circumstance of Mr. Hodgson requiring the only specimen he had sent, to take with him to England. Not improbably it may prove identical with the Falco asiaticus of Latham, described as nearly similar to the European Buzzard in the colour of its body and wings, the under parts white with stripes on the breast, tail silver-grey, the outer feather marked by obscure bars; bill bluish-black, and legs yellow and half feathered. Length twenty-two inches. Inhabits China." From the circumstance of its partially feathered tarse, it might be presumed that the present species would fall under the division Archibuteo of Brehm, but the general character of the bird is not that of the 'Rough-legged Buzzard' of Northern regions.

B. pygmæus, nobis. This is the smallest species of true Buzzard with which I am acquainted. Length eighteen inches, or perhaps rather more; of wing thirteen inches, and tail eight inches: bill to forebeed (including cere) fifteen-sixteenths of an inch in a straight line, and an inch and a quarter from point of upper mandible to gape: tarse two inches, and feathered for nearly its upper third. Colour of the beak blackish, the cere and base of both mandibles appearing to have been yellow: legs and toes also yellowish, and talons black. General hue of the upper parts uniform hair-brown, the scapularies and coverts slightly tipped with rufous-white: nape white, tipped with brown, and slightly edged laterally with rufous, which colour increases on the sides of the neck and tinges the wings, the greater feathers

of which have their outer webs uniform brown, and the inner rufescent near the shaft and white towards the margin, being barred with the same brown as that colouring the outer web; the coverts are slightly edged and more largely tipped with dull rufous: the longer upper tail-coverts are tipped with whitish; and the tail is nearly of the same brown with the back, but rather paler and more greyish, its middle feathers having four broad dusky bars, the last subterminal, and a rudiment of a fifth which becomes gradually more obscure to the outermost; over and beyond the eye is a conspicuous whitish streak: the under parts are rufescent-whitish, palest on the throat and lower tail-coverts, which are without markings, excepting a slight dusky mesial line along the throat; the breast has a broad mesial dusky streak to each feather, assuming on the belly and flanks more or less the appearance of transverse bands, which are united along the shafts of the feathers leaving oval intervals of white, and the feathers being externally margined with pale fulvous: tibial plumes very pale buff, or with rufous central markings; and fore part of the under surface of the wings similarly coloured, the quills albescent underneath and obscurely barred, but dusky towards their tips. Inhabits the Tenasserim provinces, where procured by the late Dr. Helfer.

The other Indian species of true Buzzard are—B. canescens, Hodgson, upon the Himalaya, and spreading generally over the Upper Provinces—B. longipes, Jerdon, found chiefly to the west, but also in southern India—and B. rufiventer, Jerdon, peculiar (so far as known) to the south. Mr. G. R. Gray, in his catalogue of the Raptores in the British Museum, evidently mistakes B. canescens for B. longipes. From the description in the Dict. Class., I suspect that the latter species is the Circus pectoralis, Vieillot, (placed, however, among the 'Buses,' or Buzzards, not among the 'Busards,' or Harriers,) in which case it must rank as Buteo pectoralis; but Mr. Jerdon, judging from another description of the latter, is of opinion that it cannot be identified with either of his species.

The Circus tresa, Franklin, v. Astur hyder, Sykes, assigned to Buteo by Gray and others, must now be referred to Poliornis of Kaup; Butastur, Hodgson, J. A. S. xii, 311, sinking to the rank of a synonym.

Hæmatornis, Vigors (nec Swainson); Spilornis, G. R. Gray. The distinctive characters of the species referred to this genus are at pre-



sent much in need of determination. Firstly, there is the Backa of Levaillant, or Falco bacha, Lath., which is described to be of the size of the Common Buzzard of Europe; female larger: this does not occur near the Cape, but was obtained far inland towards the tropic. Next, Falco bido, Horsfield, from Java, subsequently considered as identical with the African species by Dr. Horsfield: Mr. Vigors, however, in Proc. Zoot. Soc. 1831, p. 170, "expressed his doubts whether the Falco bacha, Lath., and F. bido, Horsfield, were the same species, although they were generally supposed to be identical. He had not the opportunity of examining a sufficient number of African specimens to determine the point." Three species, however, were distinguished by Mr. Vigors on that occasion, that of India being described by the name Ham. undulatus: but this Indian bird had previously been designated Falco cheela by Latham and Gmelin, and the young was termed F. albidus by Cuvier; it has also since been named Circaëtus nipalensis by Mr. Hodgson, and the young Buteo melanotis by Mr. Jerdon\*. The distinctions of Mr. Vigors's three species "consist chiefly in size, the Ham. holospilus (from the Philippines) being one-third smaller than H. bacha; while H. undulatus considerably exceeds the latter. The first is spotted all over the body, the second only on the abdomen; while the third is marked by spots on the wingcoverts, and by ocelli bearing an undulated appearance on the abdomen, the breast also being crossed by undulating fasciae." These last are chiefly seen in the females.

In Mr. G. R. Gray's catalogue of the specimens of Raptorial birds in the British Museum, specimens from India and Java are referred to Spilornis bacha, and others from India to Sp. undulata. I doubt, however, altogether the existence of more than one species in India, of which I presume that the males have been referred by Mr. Gray to H. bacha, and the females to H. undulatus; this latter name must indeed be superseded by cheela of Latham. But a specimen from Malacca agrees with the description I have lately received of Dr. Horsfield's Javanese bird, and differs from every one of a very extensive series of the Indian bird now before me—Istly, in its inferior

<sup>\*</sup> Latham's "Noble Eagle" would seem to be merely a fulvescent specimen of the young of this bird, such as are by no means uncommon.

size, the wing measuring but fourteen inches, and tail nine and a half\*; 2ndly, in the absence of the distinct white spots on the small wing-coverts, the extreme bend of the wing only being thus marked, and slight traces of them alone shewing elsewhere; and 3rdly, there is some difference in the barring of the primaries underneath, the third primary, for instance, having its subterminal pale band much narrower and ill defined, instead of this being broad and well defined. I should like, however, to examine several Malayan specimens before coming to a final decision; although my impression certainly is that the Indian and Malayan species are distinct, and I shall provisionally regard them as such, terming the former H. cheela, (Lath.), and the latter H. bido (v. bacha?) At all events, I feel confident of their being only one species in India, and it is probable that there is one only in Western Malasia, but a third in the Philippines and Chins.

Urrua (Hodgson, founded on Otus bengalensis, Franklin, Gould,) umbrata, nobis. Length two feet or nearly so, of closed wing sixteen inches, and tail nine inches; bill from point to gape nearly two inches, and tarse scarcely more. General cast of colour deep freckled umbre brown, unrelieved by fulvous; the outer scapularies having the usual dull white oval spots on their exterior webs: wings dashed with cinereous: tail crossed with three dark bands, and an indistinct fourth at base: and the under parts pale, with a narrow dark brown mesial streak on each feather; bill light yellow; and talons pale. Aigrettes blackish-brown. The feathers of the crown and nape are dingy grey at base, with their surface portion freckled, and a narrow mesial dusky line on each: those of the back and the scapularies have this central dark streak much broader. This fine Owl is common in Lower Bengal, was forwarded from Nepal by Mr. Hodgson, and has been obtained by Mr. Jerdon in the Indian Peninsula. It is clearly that alluded to by Latham in his description of U. (?) coromanda, as represented in a drawing twenty inches long; and it is the Urrua coromanda apud Hodgson, as noticed by him in J. A. S. vi. 373, having been forwarded by him under this name to the Society's museum.

<sup>\*</sup> In the India-house specimen, from Java, Mr. Strickland informs me that the wing measures fifteen inches and three-quarters, and the tail ten inches; which size corresponds with that of the very smallest Indian specimens.



"Le petit Hibou de la côte de Coromandel," as described by Sonnerat, and upon which is founded Strix coromanda, Lath., and Str. coromandelica, Forster, does not appear to have been since verified; and the published drawing of an Owl, referred to this, in Hardwicke's 'Illustrations of Indian Zoology,' represents a species unknown both to Mr. Jerdon and myself. It is not improbably a large Scops: this being a genus particularly rich in Indian and Malayan species, some of which are as yet not quite satisfactorily understood. Mr. Jerdon especially has made great efforts to elucidate them; and the following is about our present state of information respecting the group.

1. Sc. rufescens, (Horsfield), Lin. Tr. xiii. 140. This species has been determined with the assistance of Hugh E. Strickland, Esq., who has kindly examined the original specimens of the birds described in Dr. Horsfield's Javanese list, and has favored me with more minute notices of some of them, and identifications of others with species previously described. Elsewise, as Dr. Horsfield had given the entire length as eight inches only, I had some hesitation in agreeing with Mr. Jerdon in referring a Malacca specimen in the collection of Lord Arthur Hay, to the present species; but the difficulty is now removed by my friend Mr. Strickland, and I have the pleasure of giving the following description from Lord A. Hay's specimen. Length about eleven inches, of which the tail measures four inches and three-quarters; wing six and three-quarters; tarse an inch and a quarter. General colour ferruginous-brown, much paler below; the forehead, lower part of disk and aigrettes in part, conspicuously white, with a few minute dark speckles: upper parts marked with whitish spots along the shaft of each feather; the lower variegated with dusky and whitish in cross-striæ: primaries and tail with numerous broad dusky bars, amounting to about twelve in number on the latter: tarsal feathers not continued over the joint at the base of the toes. A strongly marked species, apparently peculiar to the Malay countries.

The next in point of size is

2. Sc. lettia, Hodgson, As. Res. xix, 176: probably Sc. lempiji apud Horsfield, from Assam, Proc. Zool. Soc. 1839, p. 155. This is the largest of three closely allied species, the distinctions of which were first observed by Mr. Jerdon. Its wing measures from six inches to six and a half, apparently according to sex; and the young have a

more ferruginous shade of general colouring than the adults. In a living specimen which I saw, the most remarkable feature (for an Owl of this genus) was its very dark irides, appearing black: and Mr. Hodgson, in his description of the species, remarks, "Iris variable, yellow in the young, brown in the old birds". It inhabits the sub-Himalayan ranges, extending to those of Sylhet and Arracan, and doubtless to all those of Assam.

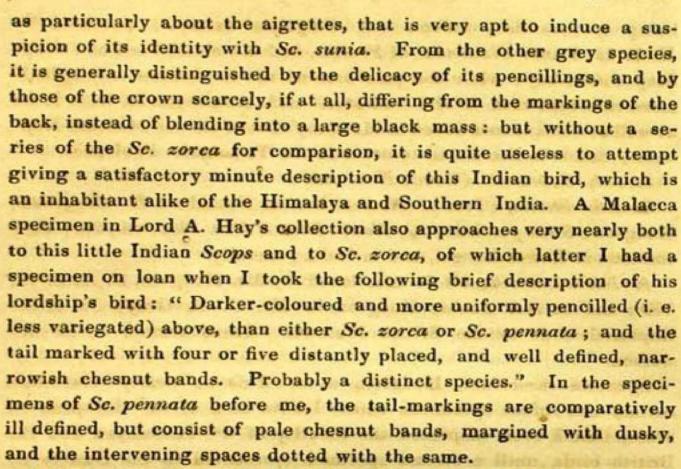
- 3. Sc. lettioides, Jerdon, MS. Differs from the last in its constantly smaller size, and more ashy colouring; the short tarsal plumes appear to be always white, with at most obscure traces of mottling. From the next it also differs in its predominant ashy tinge. Length of wing five inches and a quarter to five and three-quarters. Peculiar to the Coromandel coast, and it would seem there generally common.
- A. Sc. lempiji, (Horsfield): Strix noctula, Reinwardt; Scops javanicus, Lesson. Specimens which (from Mr. Strickland's description of Dr. Horsfield's Javanese bird,) I refer to this, from the vicinity of the Straits, are often deeply imbued with ferruginous-brown throughout: some of these being evidently in nestling dress, from the flimsy texture of the feathers; and the others are perhaps in second plumage. Others, again, have merely a weak shade of ferruginous-brown like the young of Sc. lettia; and the mottling of the upper parts is coarser and more blotched. The latter are perhaps distinct; for while the former seem to be peculiar to the Malay countries, these occur not only in Malasia, but along the Malabar range, and in China. The Society possess a specimen from Macao. Future observation must determine whether the ferruginous-brown birds are so spread; and specimens should be sought for that might exhibit a transitional moult.
- 5. Sc. sunia, Hodgson, As. Res. xix. 174. This beautiful species appears to be generally diffused over the country, though, it would seem, rather sparingly. Mr. Jerdon has obtained specimens near Nellore, and I have twice met with it in Lower Bengal. A very handsome adult female, shot near Calcutta, has the whole upper parts uniform bright chesnut-ferruginous, with inconspicuous black shafts to the dorsal plumage, tending to become obsolete, and more distinct black shafts to the frontal feathers, the aigrettes, and the fore-part of the wings; exterior line of scapularies albescent, with conspicuous black tips; and there are smaller black tips to the plumelets which



compose the disk : under parts deeply tinged with the hue of the back, but an admixture of pure white on the belly and under tail-coverts; and the breast and sides of the belly have some tolerably broad black central streaks to the feathers, those of the latter being also variegated with transverse pencillings: the unspread tail has its bands obsolete; and the bars on the outer webs of the primaries are indistinct. A male and female, apparently in second plumage, which I procured alive, have the ferruginous colour of the upper-parts somewhat deeper, though less bright, with the black centres to the feathers much more developed, and these are copiously variegated with cross-pencillings everywhere but on the forehead, crown, and the aigrettes; the under parts have also a much greater admixture of white, and the black streaks and pencillings are considerably more developed; primaries and tail conspicuously banded. The colouring of the nestling plumage would, however, seem to approximate more to that of the adult (and this, accordingly, may be likewise the case in Sc. lempiji): it is distinguished by the usual weak and unsubstantial texture of the clothing feathers, and by the narrower and more pointed form of the wing-primaries.

6 S. pennata, Hodgson, mentioned in J. A. S. vi, 369, and recognised in Mr. G. R. Gray's list as distinct from the European Sc. zorca, to which it is nearly allied \*: Strix bakkamoëna, (?) Pen., and indica (?), Gmelin, founded on a rude drawing of a Cingalese specimen, no doubt inaccurate as regards the "scarlet" colour of the irides, the exceedingly small size given as that of nature (about four inches long), and also the excessively contrasted barring of the primaries; likewise in the lower portion of the tarsi being represented as bare. The present species is smaller than any of the foregoing, its wing measuring from four inches and five-eighths to five and a quarter long; and it so nearly resembles Sc. sunia in its general characters, that I formerly suspected it would prove but a grey variety of that bird: its under-parts are marked very like those of Sc. sunia, and there is a certain admixture of ferruginous especially about the breast, and a decided tinge of the same chiefly upon the large alars and ther coverts, and seen elsewhere more or less upon the upper parts,

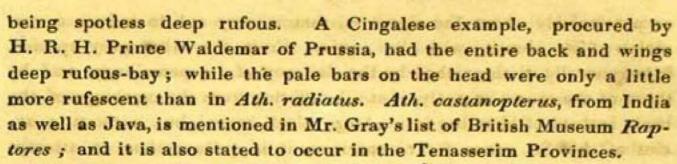
<sup>\*</sup> A specimen of Sc. zorca is there noted from China; and this species has long been stated to occur in Northern Asia; at least the Strix pulchella, Lin, of Russia and Siberia, has been currently identified with it.



A Sc. gymnopodus, from India, is mentioned in Mr. Gray's catalogue, but which does not appear to have been yet described: and the same gentleman gives two new species from the Philippine Islands, Sc. philippinensis and Sc. megalotis.

The genus Athene is scarcely less developed in this part of the world. In India, we have

- 1. Ath. cuculoides, (Vigors). Common in the Himalaya, in the hill ranges of Assam, Sylhet, Arracan, and the Tenasserim provinces, and extending eastward to Chusan: but unknown in the ranges of peninsular India.
- 2. Ath. Brodiei, (Burton): Noctua tubiger, Hodgson; Strix passerina (?), mentioned in Royle's list. Himalaya.
- 3. Ath. radiatus, (Tickell): Ath. erythropterus, Gould; Noctua perlineata, Hodgson; N. cuculoides apud Jerdon, Catal. Himalaya, and the ranges of Central India.
- 4. Ath. castanopterus, (? Horsfield): Strix spadicea, (? Reinwardt). Malabar range, and the upland districts of Ceylon. This species differs from the last in its more rufous general colouring, especially on the whole wing, the basal portion of the primaries (except the three first)



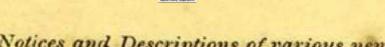
- 5. Ath. Sonnerati, (Tem.) Non. vidi\*.
- 6. Ath. brama, (Tem.): Noctua indica, Franklin; N. tarayensis, Hodgson; Strix persica, (?), Nouv. Dict. d'Hist. Nat, vii., 26. + Very common in Lower Bengal, and in India generally.

A Noctua auribarbis is mentioned by Mr. Hodgson, J. A. S. vi., 369; and an Ath. badia, Hodgson, in Mr. G. R. Gray's list of the Raptorial birds in the British Museum. These remain to be described.

Syrnium nivicolum, Hodgson, n. s. This so nearly resembles certain non-rufous specimens which I have seen of the European S. aluco, that I even suspected the identity of the Himalayan and the British birds, until a second specimen (presented to the Society by Mr. Jerdon) repeating the characters of the one which Mr. Hodgson took with him to England, inclines me now to the opinion that they are distinct; the present being also decidedly a larger bird. The length of Mr. Hodgson's specimen was about seventeen inches, of wing eleven and a half, and tail seven and a quarter; tarse two inches: and I took the following brief description of it. "Colour of the upper parts mingled brown and blackish; rather minutely mottled, producing a dark brown ensemble; head and neck tawny or fulvous-brown, with dark mottling at tips of feathers; a streak above each eye, ascending from the facial disk, and the mesial part of the crown, between these streaks, blackish. Under parts bright tawney-brown, mingled with dark brown and whitish : feathered tarsi and toes fulves-

+ Ath. brama is common about the foot of the mountains near the town of Erzeroum. Proc. Zool. Soc. 1839, p. 119.

<sup>\* &</sup>quot;Inhabits India. Leugth eleven inches; all the upper-parts of the body are reddish-brown, the head being adorned with small white spots, and the wing-coverts with large spots of the same: the quills and tail-feathers are like the back; the space round the eyes is reddish-white, as well as the face and throat: all the under-parts are white, transversely but distantly barred with brown: the down on the tarsi and toes is red: the beak and claws are yellow."—Stephens.



cent, with deeper tawney spots; alars and tail banded, the latter with mottled light brown upon a dark ground." The second specimen (also Himalayan) has the wing twelve inches and a quarter long, and the tail seven and a half. It agrees generally with the foregoing description, but has less of the fulvous tinge, and is, I think, more obviously distinct from S. aluco. The minute mottling of the plumage is difficult to express in words: but the feathers of the under parts may be described as whitish, partially tinged with fulvescent, and having a dusky central streak, broader towards the tip of the feather, and three or four narrower transverse streaks of the same; and the like may be described as the basis of the markings of those above, modified so that the pale portion appears, more or less, as a series of pale spots on the two webs of each feather ;-the well developed transverse markings of the feathers constituting a good distinction of this bird from the European S. aluco, independently of its deficiency of rufous colouring. The form is perfectly true to the generic type of S. aluco.

Of the species of Strix, as now limited, three pertain to the Fauna Indica.

- 1. Str. javanica, Gm., de Wurmb, apud Latham: Str. candida, Tickell, J. A. S. II. 572; Str. longimembris, Jerdon. Buchanan figured it; but Latham is wrong in stating that the claw of its middle toe is not serrated; and it has also four well defined blackish bars on the tail. Found chiefly in peninsular India. Whether it be truly de Wurmb's Javanese species, I have no immediate means of ascertaining\*.
- 2. Str. flammea, Lin. : Str. javanica, apud Horsfield (?), Sykes, and Jerdon. Very common, and differing in no respect from the British bird.
- 3. Str. badia, Horsfield. Mr. Hodgson obtained a single mutilated specimen of this bird in Nepal; and the Society has been favored with a very fine one by Captain Abbott, shot in the island of Ramree, Arracan. About Malacca and Singapore, it would seem to be not uncommon.

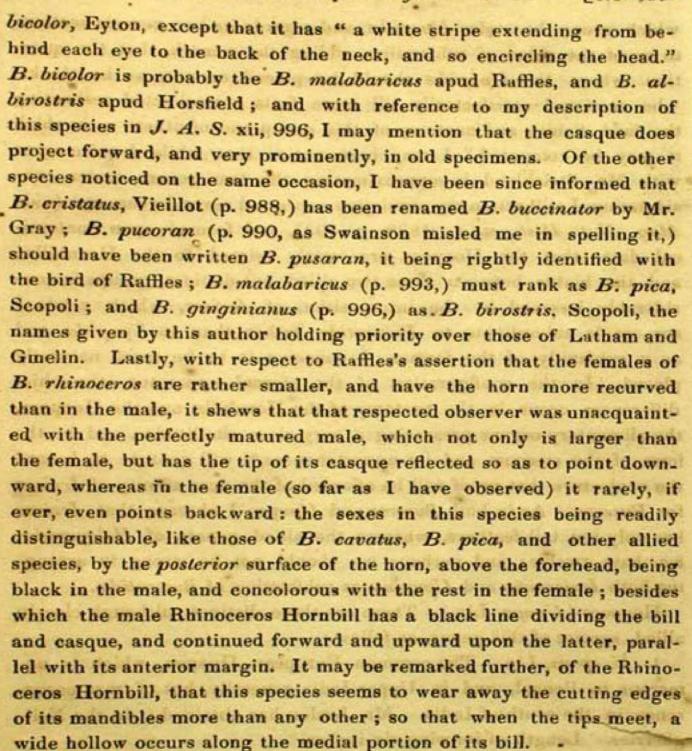
<sup>\* &</sup>quot; Horsfield's Strix javanica," writes Mr. Strickland, " has the tarsi five-eighths of an inch longer than in a British Str. flammea. It comes near longimembris, Jerdon, but is mottled grey above, instead of blotched with brown." Dr. A. Smith has figured a species from South Africa, allied to true javanica (? v. longimembris), by the name M. capensis.



We will now leave the Raptores, and commence the varied tribes of Perchers with a new Hornbill:

Buceros carinatus, nobis. Length about thirty-two inches, of wing thirteen and a quarter, and tail a foot, its outermost feathers an inch shorter than the middle ones: bill to eye five inches, the casque little elevated, at most about three-quarters of an inch, and the depth of bill and casque together two inches and a quarter. Form of the casque truly carinate, like the keel of a boat, rising with a curve from the forehead, extending for two-thirds of the length of the upper mandible, and its anterior portion sloped forward: a lateral ridge exterior to the nostrils causes these to open upwards. In one specimen before me, (which I suspect is an old female,) the bill and casque are wholly black; but in another, with the latter somewhat less developed, (probably an adolescent male,) the bill is yellowish-white, except the basal two-thirds of the lower mandible, and the extreme base of the upper, continued along the tomize for half its length, and along the upper portion of the casque to near its extremity. In the former specimen, the medial portion of the belly, the vent, and the lower tailcoverts, are dark brownish-albescent; while in the latter this is confined to the vent and lower tail-coverts: but there is no other difference of plumage. The throat is naked, as likewise a large space surrounding the eyes. Occiput adorned with a large full crest of lengthened feathers, rounded at the tips, and measuring two inches and three-quarters long, or rather less in the black-billed specimen (or old female?). General colour black, with green and purple glosses, the edges of the secondaries and tertiaries, and of the lengthened occipital feathers (more or less), whitish-brown-much as in B. gingalensis, to which the present species is certainly allied: terminal four and a half to five inches of the tail deep black, the rest brownish-ashy, darkest at base, and paling to its junction with the black. In both specimens the edges of the mandibles retain their original serration, more or less perfectly, which is seldom seen in adult Hornbills. Procured at Malacca by the Rev. F. W. Lindstedt, to whom the Society is indebted for a large and valuable collection of the mammalia and birds of that particularly rich, but little explored, locality.

The B. comatus, Raffles, Lin. Tr. xiii, 339, would seem to be allied to the above in form of bill, but is evidently distinct. B. malayanus, Raffles, ibid. p. 292, would seem to approximate the adolescent B.



Genus Irrisor, Lesson. In the 'Annals and Magazine of Natural History' for 1843, pp. 238 et seq., is inserted a paper read by Mr. Strickland to the Zoological Section of the British Association Meeting of that year, wherein is argued the near affinity of this well marked genus for the Hoopoes (Upupa), in opposition to the opinion of the Baron De la Fresnaye and others, who have contended that these two genera are, at most, but very distantly allied: and though Mr. Strickland has hazarded no decided opinion respecting the immediate affinities of the combined group formed of Irrisor and Upupa,



which group he styles Upupidæ, and regards its two generic sections to be of the value of subfamilies, adding the remark, that the question where the Upupidæ should be placed cannot, as he thinks, "be answered satisfactorily till more facts are collected respecting the food, habits, and anatomy of this group and of others with which it may be compared," I may here notice that while I quite agree with Mr. Strickland in approximating the two genera under consideration, I still retain my conviction expressed several years ago (vide Mag. Nat. Hist., n. s., 1838, p. 593), and formed upon anatomical data, that the Hoopoes are nearly related to the Hornbills; and the hiatus between these two allied, but distinct, groups is considerably lessened by the interposition of Irrisor, which genus I suspect is subordinate to Bucerotidæ rather than to Upupidæ, and as a subfamily of the former, I conceive it to be most naturally placed. In the configuration of the sternal apparatus, the chief differences occur in the anatomy of the Hornbills and the Hoopoes, the alimentary organs presenting a very close similitude; and in the form of the sternum and its appurtenances, I will venture to hazard the conjecture that proof will be afforded of the near affinity of Irrisor for Buceros. As in both Buceros and Upupa, I observe that Irrisor has only ten tail-feathers, whereas the allied genera of Halcyonida, &c. have twelve; and perhaps we should not be wrong in arranging both Irrisorinæ and Upupinæ as subfamilies of Bucerotidæ.

Hoopoes (Upupa, Lin.) There are three distinct, although closely

allied, species of this genus, as follow:

1. U. epops, Lin. The common European Hoopoe, which is numerous in Bengal, and in Upper India generally, but of rare occurrence in the south of India. Mr. Jerdon has obtained it in the Neilgherries. Length of its wing six inches.

2. U. senegalensis (?), Swainson, 'Birds of W. Africa,' ii, 114, Nat. Libr.: U. minor, apud Jerdon. This quite agrees with Mr. Swainson's description of the Senegal Hoopoe, except that some specimens have a trace of whitish on the hinder crest-feathers, where indeed it chiefly appears in U. epops. The wing varies from four inches and three-quarters to five and three-eighths in length; but the bill is as much elongated as in the last. Common in most, if not all, parts of the peninsula of India.

3. U. minor, Shaw. Distinguished from both the preceding by having the primaries plain black, without the broad white band con-

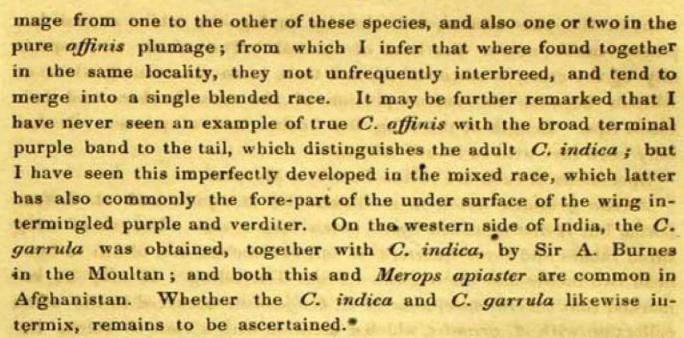
stant in the two others; and also by having the white caudal bar placed much nearer the base of the tail. The colour, too, especially of the crest, is more rufous, and there is no intervening white or whitish between the rufous portion of the crest-feathers and their black tips. Length of the wing five inches and a quarter. It has only been met with in South Africa.

Specimens of each are in the Society's Museum.

Alcedo grandis, nobis, n. s. Resembles A. ispida and A. bengalensis, but is distinguished by its much larger size. Length of wing
three inches and three-quarters, of tail two inches, and of bill to forehead two inches and one-eighth. From Darjeeling. It may be remarked that several specimens of A. bengalensis occurred in the same
collection with A. grandis, which I mention with a view to refute the
opinion entertained by some theorists, that the disparity of size between either of these species and A. ispida is due to the influence of
climate and other local causes.

Haleyon capensis, (L.) Specimens of this bird (if absolutely the same,) from the vicinity of the Straits, differ from those of India in being much more intensely-coloured, both above and below; the ferruginous of the under-parts, which is very deep in apparently the males, suffusing the nuchal collar and throat, which latter does not tend to be albescent, and there is a considerable bluish-green gloss upon the brown cap, never seen in Indian specimens, and reminding one of the cap of Todiramphus collaris, (Scopoli and Swainson, v. chlorocephalus of Gmelin.) In fact, there seems as good reason for distinguishing these Indian and Malayan birds as species, as exists in the instance of Cergle rudis of Africa, and C. varia, Strickland, of Asia; and another example of a Malayan bird which greatly exceeds its Indian representative in intensity of colouring, occurs in the common Jungle-cock of the two regions, alike referred to Gallus bankivas, Tem.

Coracias affinis, McClelland and Horsfield, Proc. Zool. Soc. 1839, p. 164. The numerous specimens of Rollers from Assam, Arracan, and Tenasserim, which I have seen, all pertain strictly to this species; having the upper parts greener than in C. indica, the neck and breast devoid of the reddish-brown colour proper to the latter species, being purplish-dusky varied with bright purple on the fore-neck, and the entire under surface of the wing, except near the tips of the primaries, is deep purple: but I have obtained several specimens in the vicinity of Calcutta, and some from Tipperah, which present every gradation of plu-



Woodpeckers. Of the species of this group noticed in J. A. S. XII, 998 et seq., I have now to remark, that P. (Gecinus) viridanus would seem to be the P. dimidiatus of the Dict. Class., though not of Hardwicke and Gray; P. occipitalis, Vigors, should be termed barbats, Gray (if it be not affinis of Raffles), as there was previously a P. occipitalis, Valenciennes; P. nipalensis, Gray, may, I think, be safely referred to P. chloropus, Vieillot, as I before suggestedt; P. (Chrysocolaptes) melanotus, nobis (p. 1005, and XIII, 394,) v. P. Ellioti, Jerdon, is decidedly the P. goënsis, Gm., founded on the Pic vert de Goa of Daubenton; and P. (Chr.) strictus of Horsfield, v. sultaneus, Hodgson, v. strenuus, Gould (noticed in Proc. Zool. Soc. 1839, p. 165, and also in Dr. Royle's list of birds from the neighbourhood of Sabarunpore, though never, I believe, described by this name), which has been commonly referred to P. goënsis, must retain the name strictus, Horsf.: lastly, kaving obtained a Malacca specimen of Microcolaptes abnormis, Tem. (p. 1005), I am enabled to confirm my former suspicion of the near affinity of Sasia ochracea, Hodgson, which, though distinct as a species, is most closely allied to M. abnormis. M. ochraceus is common in the hill ranges of Assam, Sylhet, and Arracan, being generally seen hopping from twig to twig of bushes or low branches of trees, though occasionally climbing like an ordinary Woodpecker.

<sup>\*</sup> Two specimens just received from Gow-hatti (Assam) were both pure C. affinis; while three others from the neighbouring district of Rungpore were unmixed C. indica.

<sup>†</sup> This bird makes a near approach in structure to P. (Dendrobates) immaculatus, Sw. (received from the Cape): accordingly, it would appear that Dendrobates. is scarcely, if at all, separable from Gecinus.

Picus (Gecinus) malaccensis, Lath., founded on le Pic de Malacca of Sonnerat, may be described anew with advantage from specimens presented to the Society from Malacca. It is allied in size and form to P. chloropus (v. nipalensis), and in plumage also to the species of Brachylophus, but differs very decidedly from the latter in the shape of its bill, which is larger and more that of a typical Gecinus than the Dendrobates-like beak of P. chloropus: it has also the yellow nuchal crest less developed than in the latter, and resembling that of Brachylophus puniceus. General colour dingy green, brightest on the back, where more or less tinged with yellow, especially on the rump; beneath inclining to dusky, barred with dull white on the flanks, but the latter less predominating than in P. chloropus: wings crimson, with dusky primaries, and green tips to the longest tertiaries: tail black. The male has the whole top of the head, lengthened occipital feathers, and moustaches, crimson; while the female has the coronal feathers green, tipped only with crimson, and merely the long occipital feathers as in the male, below which those of the nape are yellow in Bill dusky above, the lower mandible yellow; and feet have apparently been green. Length ten inches, or nearly so; of wing four and three-quarters to five inches; and tail three and a half to three and three-quarters; bill to forehead an inch and a quarter. From Malacca.

Subg. Gecinulus, nobis. This is a third form of three-toed Wood-pecker (in addition to Picoides, Lacep., of northern climates, and Tiga, Kaup, v. Chrysonotus, Sw., of south-eastern Asia and its islands), most nearly allied to Gecinus, from which it differs in the shortness and lateral compression of its beak, and the small size of the feet, which have besides no inner fourth toe. As a peculiar form of Woodpecker, it is very distinct, though represented only (so far as I am at present aware,) by

P. (Gec.) Grantia,\* McClelland and Horsfield, P. Z. S. 1839, p. 165. Length nine inches and a half, or ten inches; of wing five inches; and tail three and three-quarters: bill to frontal bone an inch and one-eighth; and spread of foot an inch and three-quarters. Colour somewhat brownish red above, the secondaries and tertiaries having three light red bars, and the greenish-dusky primaries four or five yellowish ones: tail similarly banded; breast and under parts dusky-



green; head and neck light yellowish-green, paler and browner towards the beak, and the crown of the male only, dull crimson. Bill white, with some dusky at the base of both mandibles; and feet apparently dark slaty. Hab. Darjeeling, and the mountain ranges of Assam.

Of the subgenus Tiga, Kaup, three allied species exist, which have never been yet properly distinguished.

- 1. P. (T.) Shorei, Vigors, P. Z. S. 1831, p. 175; Gould's 'Century,' pl. XLIX. Distinguished by its superior size, the wing measuring six inches long; by the crimson of the rump spreading over, or rather tinging, more usually the entire back (more or less); and by the elongated pale central streaks of the coronal and occipital feathers of the female, these streaks being continued nearly throughout the feather, and anteriorly often spreading over the whole feather, so that the forehead becomes almost plain light brown. In one female before me, there are also some intermixed crimson feathers on the occiput, which I have never seen in either of the other species: but whether these are of constant occurrence I do not know, and another female in the Society's museum is unfortunately deficient of feathers just at this part. Inhabits the sub-Himalayan region, as well as the hill ranges of peninsular India; but I have never seen it from the eastward of the Bay of Bengal.
- 2. P. (T.) intermedius, nobis. Exactly midway between the two others; the whitish on the coronal feathers of the female forming very elongated spots, rather than central streaks; and the back above the rump not usually suffused with crimson. Wing five inches and a half to five and three-quarters long. Common in Nepal, Assam, Sylhet, Tipperah, Arracan, and Tenasserim; and the only kind which I have seen from those parts, Nepal excepted.
- Wing but four inches and seven-eighths, to five inches and one-eighth, long: and the whitish spots on the head of the female very much contracted, tending indeed to become obsolete, and their form a lengthened oval, narrow and minute. The bill to gape in P. Shorei measures an inch and three-quarters, in P. intermedius one and a half, and in P. tridactyla one and a quarter; in a young female of P. tridactyla before me, scarcely one and one-eighth. The specimens described are from Malacca, and are of the only size that I have hitherto seen from the Malay countries. Dr. Horsfield, however, gives the length of his P. tiga as eight inches and a half; whereas Raffles

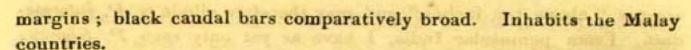
assigns "above ten inches," and may therefore allude to P. intermedius. From peninsular India, I have as yet only seen P. Shorei: but Mr. Jerdon remarks that "the specimens shot below the Ghauts are considerably smaller than those obtained at a great elevation; the latter attained the size of P. Shorei, though not differing in colour from the smaller ones. The length varies from nine inches and a half to nearly twelve inches."

Of the closely allied division Brachypternus, Strickland, there seems to be a second species in southern India, additional to P. aurantius (v. bengalensis, &c.):

P. (Br.) micropus, nobis. Distinguished from P. aurantius by its inferior size, the wing (of an adult male,) measuring but five inches, instead of five and a half, as in several adult specimens (male and female,) of P. aurantius; bill to gape an inch and five-sixteenths, instead of one and five-eighths; and extended foot one and seveneighths, instead of two and one-eighth. There is a general neatness and well defined character of the markings, as distinguished from those of P. aurantius, which arrests the eye at a glance: the frontal feathers, to a level with the anterior portion of the eye, are not tipped with crimson, as in the other; the black of the nape is continued lower upon the shoulders, considerably contracting the golden orange of the back; and the wings are duller aureous, contrasting more with the brilliant dorsal hue: the white markings of the throat and fore-neck are also reduced to small rounded oval spots, those of the breast being larger but similarly oval, and of the under parts below, narrower than in P. aurantius. I found this species upon a single specimen forwarded by Mr. Jerdon, but feel no doubt of its distinctness, especially when I recall to mind the close similitude of the three species of the preceding group; from which division the present one is only just separable.

Micropternus, nobis. By the same rule that Brachypternus is recognised apart from Tiga, this must be separated from Meiglyptes; having the inner fourth toe and claw minute. The colouring is also peculiar. Type P. badius, Raffles, under which, again, two species have been hitherto confounded.

1. P. (M.) badius, Raffles: P. brachyurus, Vieillot. Wing but four inches and one-eighth to four and a quarter long: head pale above, the throat dark; the feathers of the latter dusky, with pale lateral



2. P. (M.) phaioceps, nobis. P. rufus, Lath., apud Gray, nec Gmelin; Rufous Indian Woodpecker, Latham. Wing four inches and three-quarters long, and the rest in proportion: head subfuscous above, the throat pale; the feathers of the latter concolorous with those of the body, or nearly so, having lighter lateral margins; black caudal bars narrow. Inhabits India proper, extending eastward to Tipperah and Arracan.

The type of Meiglyptes is P. tristis, Raffles, v. pæcilophus, Temminck, which together with an allied species, P. (M.) brunneus, also from the Malay countries, is referred to Hemicercus by Mr. Eyton.

P. (M.) jugularis, nobis, is a third species, of a shorter and thicker form than the two above-mentioned, and in size, form, and colouring, much resembling P. (Hemicercus) canente, Lesson, of which the female is P. cordatus, Jerdon: but it is readily distinguished by the very different form of the bill, by the buffy-white colour of the nape, and by the rays or specks of the same hue upon its black throat. Length about seven inches and a half, of wing four inches, and tail two and one-eighth; bill to forehead seven-eighths. Colour black or brown-black, varied with buffy-white, and an obscure dull crimson moustache in the male; occipital feathers elongated and black : neck whitish, more or less deeply tinged with buff, and continued as a streak along each side of the breast in front of the wings; rump also buffy-white, a broad oblique stripe of the same upon the wings, and their nether surface and edge are of this hue, the large alars being broadly banded at base internally, with slight narrow pale bars or seriss or small spots on their outer surface; forehead, throat, and sometimes crown, more or less speckled or rayed with the same pale colour that variegates the rest of the plumage. Inhabits Arracan and the Tenasserim provinces (specimens from the latter territory having been erroneously referred to P. pæcilophus, Tem., in X, 828).

P. (Hemicercus) concretus, Tem. It is probable that there are two species confounded under this name. All that I have seen are from the vicinity of the Straits, and accord with Stephens's "Sumatran va-

<sup>\*</sup> These would seem enumerated as distinct in Mr. Eyton's catalogue, Proc. Zool. Soc. 1839, p. 106; but it is evidently a mistake of the printer.

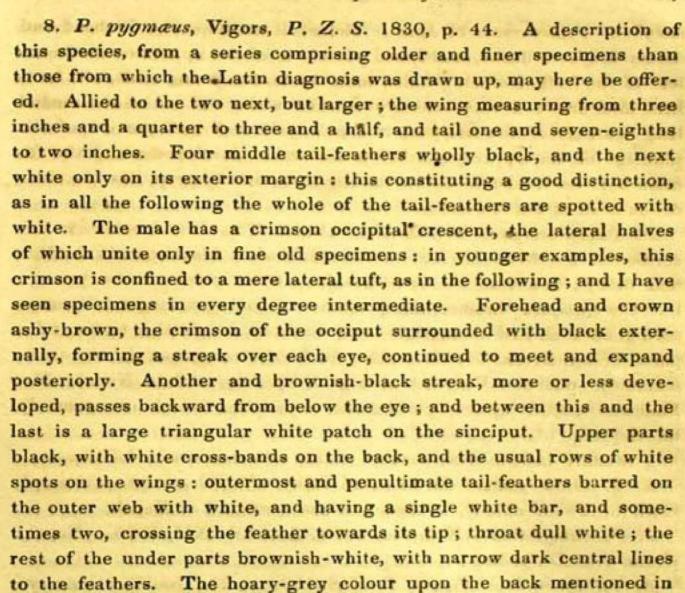
riety" of P. concretus of Java. The adult male has the forehead and crown bright crimson, continued on a few of the uppermost and central of the long feathers of the occiput: in the young male, the forehead and crown are chesnut-brown, with a tinge of red on the medial long feathers of the occiput; the pale yellowish buff portion of the plumage of the upper parts being also more developed: and the female has the forehead, crown, and occiput, smoky-grey, like the sides of the head of the males.\*

P. (Dendrocopus) darjellensis, nobis. This Woodpecker is described in J. A. S. XI. 165, as the adult of P. himalayensis, Jardine and Selby; and true P. himalayensis is there given as the young: but the two are distinct, the present one having a larger bill, measuring an inch and three-eighths to forehead, in addition to its under parts being streaked with black; its white wing-spot is also considerably smaller. Very common at Darjeeling, and in Nepal. Mr. Hodgson sent it by the hybrid name majoroides, which can scarcely be adopted.

The other Indian Woodpeckers of this subgenus are as follow:-

- 2. L. himalayensis, Jardine and Selby, Ill. Orn., 1st. series, pl. CXVI. Found chiefly, I suspect, to the westward of Nepal.
- 3. P. cathpharius, Hodgson, nobis, J. A. S. XII, 1006. Nepal: common at Darjeeling.
- 4. P. hyperythrus, Vigors, P. Z. S. 1831, p. 23; Gould's 'Century,' pl. L. Remarkable for the slender form of its bill. Himalaya.
- 5. P. Macei, Cuv.; figured in Hardwicke's Itl. Ind. Zool.: P. analis, Tem.; P. minor, apud Raffles and Horsfield; P. medius from India, apud Latham. Northern India generally, and Malay countries. The only species of the subgenus found in Lower Bengal, where exceedingly common, as it also is in the vicinity of the Straits. It frequently occurs, likewise, in collections from the Himalaya.
- 6. P. brunnifrons, Gould's 'Century,' pl. LII; Vigors, P. Z. S. 1831, p. 176.: P. auriceps, Vigors, ibid. p. 44. Himalaya.
- 7. P. mahrattensis, Latham: P. aurocristatus, Tickell, J. A. S. II, 579: figured in Gould's 'Century,' pl. LI., and also by Hardwicke and Gray. Hilly regions of India generally.

<sup>\*</sup> P. validus, Tem., is allied in form to Hemicercus, but cannot be arranged under it: and as another marked sub-genus, I may indicate the P. funebris, Valenciennes, v. modestus, Vigors.



9. P. canicapillus, nobis. Differs from P. moluccensis in the much blacker hue of its upper parts, in the pale ash-colour of the head, a little anged with brown and bordered laterally with black, from amid which appears the slight crimson sincipital tuft of the male; the size also is rather larger, the wing measuring three inches and one-eighth to three and a quarter, tail one and three-quarters, and bill to forehead five-eighths: the under parts are whitish, purer on the throat, and the rest marked with central dusky-black lines. Common in Arracan.

Mr. Vigors's description, must refer to that of the base of the feathers,

- 10. P. moluccensis, Latham; figured by Hardwicke and Gray. Distinguished by its prevalent brownish or sooty-black colour, and its rufescent brown head and streak passing through the ear-coverts. Hab. Central and Southern India.
- 10. P. nanus, Vigors, P. Z. S. 1830, p. 172. Has a larger bill than either of the three preceding species, measuring three-quarters of

an inch to the forehead; wing three inches and a quarter. The breast is marked with dusky oval spots, passing into streaks below; the aspect of the under parts being much more spotted and less streaky than in the foregoing; a very strongly marked white line commences above the eye (as in the last), and is continued along the sides of the occiput to the nape; and another broad white line from the angle of the mouth is continued to below the ear-coverts. This species is alluded to as a variety of P. moluccensis by Mr. Jerdon; being thus met with in Southern India, as well as in the Himalaya.\*

Of foreign Woodpeckers in the Society's museum, one of which I can find no description, may be designated

P. (Colaptes) hypoxanthus, nobis. Length above a foot, of wing five inches and three-quarters, and tail five inches; bill to gape one and three-quarters, its form less curved than in P. auratus, the lower mandible not being arched at all. Upper parts crimson, darker on the wings, and passing to yellowish olive-green on the external webs of the large alars, the secondaries and tertiaries with their coverts being broadly margined with dark crimson externally, and the primaries having yellow shafts: tail black above, its outermost feathers freckled with brownish-yellow: a large and broad crimson moustache, and the space between this and the crown, comprising the lores and ear-coverts, greenish-yellow: throat black, the feathers edged with yellowish; those of the breast black margined with dark crimson, and leaving a pale central mark on each, inclining to be linear on those of the foreneck, and gradually assuming the form of a transverse bar more downward: the rest of the under parts and inside of the wings bright greenish-yellow, with some black bars anterior to the flanks. Bill blackish; and legs brown. Most probably from some part of South America.

Before quitting the *Picida*, I may remark that the Himalayan Honeyguide (*Iudicator xanthonotus*, nobis, J. A. S. XI, 166, and XII, 1010,) has a much shorter beak than in the various African species; with which it accords, however, in all other respects.

<sup>\*</sup> The whole of the above are in the Society's museum: and I have before remarked that P. Ellioti, Jerdon, which was referred by that naturalist to the present sub-genus, is the true P. (Chrysocoloptes) goënsis, v. melanotus, nobis, passim.

<sup>+</sup> To give some idea of the present state of the Society's museum, in the department of Ornithology, it may be here mentioned that of the Linnwan genus Picus, there are now 121 mounted specimens, appertaining to 49 species; and of these but 10 speci-

Cuculidæ. Of the series of this family grading from Dasylophus to Taccocua of Lesson, the Indian and Malayan species may be thus classified. Rhinortha belongs to the particular group, but ranges apart from the graduated succession observable in the rest: and of this genus, I have to remark that the supposed two species which have been hitherto currently admitted, are one and the same; Rh. lucida, Vigors, v. Anadænus rufescens, Swainson, v. Phænicophans viridirostris, Eyton, referring to the young, and Cuculus chlorophæus, Raffles, v. An. rufus, Swainson, to the adult; the latter being also described, and the former figured as Bubutus Isidoria by M. Lesson in the zoology of M. Belanger's Voyage. It will now rank as Rh. chlorophæa, (Raffles); and I have suggested that perhaps a second species exists in the Cuculus melanogostir of Vieillot, vide J. A. S. XI., 924.

Dasylophus, Sw. Species, D. Cumingi, (Fraser,) and D. superciliosus, (Cuv.,) vide J. A. S. XI, 925.

Phænicophaus, Vieillot .- A. With the nareal apertures narrow, and placed near the edge of the bill. (Cuv.) 1, Ph. pyrrhocephalus, (Forst.,) vide J. A. S. XI, 924: (this species has the papillose naked red skin on the sides of the face very greatly developed; its alleged Cingalese habitat needs verification, especially as it is likewise stated to inhabit Africa.) B. " Nostrils elongate, and situate at the base of a groove which extends nearly to the middle of the beak." (Horsfield.) 2, Ph. melanognathus, Horsfield. C. Nostrils elongate, basal, and oblique; but no groove to the bill. 3, Ph. sumatranus, Raffles, D. Nostrils basal, with rounded aperture. A, Ph. viridis, Lev. (Cuculus melanognathus apud Raffles, &c.): 5, Ph. Diardi, (Lesson; Ph. tristis annica, J. A. S. XI, 928, and probably Ph. Crawfurdii, Gray). 1. Incertæ sedis. 6. Ph. (?) calorhynchus, Tem., erroneously stated to be identical with Zanclostomus javanicus. Three of the above are in the Society's museum, viz. Ph. viridis, Ph. sumatranus, and Ph. Diardi; these being all common in the vicinity of the Straits. The first has a more tumid bill, and the second a proportionally

mens (of 7 species) are foreign to India and the Malay countries. Of other Picidæ (consisting of the genera Yunx, Picumnus, Microcolaptes, and Indicator, the Bucco group being excluded), we have 10 mounted specimens, of 7 species. Every described (or at least every authenticated) Indian species of Woodpecker is now in the collection: but there are several yet wanting from the eastern islands. July 6, 1845.



longer bill, than in the others; but all are closely allied, and have a large naked space surrounding the eyes.

Zanclostomus, Swainson. A. Bill green; nostrils with rounded oval aperture; small bare and papillose skin surrounding the eyes; tail greatly elongated. 1, Z. tristis, (Lesson; Ph. longicaudatus, nobis, J. A. S. XI, 1095.)—B. Allied to last, with green bill; nareal orifices oval and minute; no expanded and papillose naked space surrounding the eyes. 2, Z. viridirostris, Jerdon.—C. Red bill, and nareal aperture linear; no papillose skin on the face. 3, Z. javanicus, Horsfield, &c., vide J. A. S. XI. 1097; Piaya erythrorhyncha, Lesson.—D. A fourth section would seem to be constituted by Z. flavirostris, Swainson, Birds of W. Africa, Nat. Libr., Orn., VIII, p. 183, and pl. XIX. Should it be thought necessary to separate the two first, they should rank under Melias of Lesson.

Taccocua, Lesson. This will comprehend the species confounded under the "Sirkeer Cuckoo" of Latham. As compared with the preceding, they have a shorter and more compressed bill, approaching nearly in form to that of Centropus; and they further approximate the latter genus in the more than subspinous character of their plumage, and in their ground habits, although their inner hind claw is short and curved. The following are now for the first time distinguished.

1. T. infuscata, nobis: probably Coccyzus chrysogaster of Royle's list of birds from the vicinity of Saharanpore. At least two species of this group are indicated in Latham's description of his Sirkeer Cuckoo (Gen. Hist. 111, 267), the present being that first noticed by him, and being characterized by its larger size and infuscated colouring. Length nineteen inches at least: \* \* plumage on the upper parts dusky, with a tinge of purple."—The specimen before me agrees with others which I have seen from the Himalaya, and measures nineteen inches in total length, the tail ten inches, its outermost feathers three inches and a half less; wing six and a half; tarse an inch and five-eighths. Bill (as in the others) bright cherry-red at base, yellow at the tip, with a triangular black spot on each side of the upper mandible: feet dusky-leaden, browner on the tarse. In all three species, the upper parts may be described as brown, washed with dusky-green, the feathers having shining black shafts; but in the Himalayan bird,

<sup>\*</sup> This species has the somewhat firmer tail of a true Phænicophaus.



scarcely a trace of the brown is visible; lower parts paler, slightly washed with ferruginous on the fore-neck and breast, the belly and lower portion of the tibial plumes deep ferruginous, of a much darker shade than in the other species: tail with all but its middle pair of feathers broadly tipped with white, as in both the others. Peculiar, I suspect, to the sub-Himalayan region.

- 2. T. sirkee ; Centropus sirkee, Hardwicke and Gray : C. cuculoides, Smith and Pearson, J. A. S. X, 659. This is probably that, next mentioned by Latham as figured in a drawing; and it is of course the Campore species subsequently noticed by him as weighing "four ounces eight drachms." I believe it also to be that figured by Hardwicke, and referred to by Latham as weighing but "three ounces six drachms and a half;" a difference from the preceding which might depend upon condition, and to a certain extent on sex, these birds being often extremely fat. Describing from Hardwicke's drawing, Latham gives the two middle tail-feathers as "eight inches in length," but from the published copy of the same drawing, I should say that they were nearly ten inches. A. fine specimen before me (from Cawnpore) measures seventeen inches in length, the tail nine and a half, its outermost feathers three and three-quarters less; wing six inches; and tarse an inch and a half. Upper parts much paler and more brown than in the preceding species, having scarcely a trace of the green; below paler ferruginous, more generally and uniformly diffused on the belly, flanks, and tibial plumes, and tinging much more deeply the fore-neck and breast. Mr. C. W. Smith describes the upper parts as being of a brownish satin colour, a term which does not convey a very definite idea in the absence of a specimen, but which is nevertheless sufficiently recognisable when the bird is under examination : the hue is lighter and more rufescent than in the next species. Hab. Bengal.
- 3. T. Leschenaultii, Lesson: Zanclostomus sirkee, apud Jerdon. Distinguished by its inferior size, and generally more or less ashy foreneck and breast, and whitish throat; the ferruginous colour of the belly is scarcely so deep as in the last, and there appears always to be a marked distinction of hue between the breast and belly, although the former is more or less tinged with ferruginous; whereas in the Bengal species there is no such marked distinction of hue, the fore-neck and breast being concolorous with the belly, or very nearly so, shading im-



perceptibly from one to the other. In the hue of its upper parts, this species is intermediate to the two others, but approaches nearer to the Bengal one. Its entire head has often a distinct ashy cast, not seen in the others. Length fifteen or sixteen inches, the tail eight or nine inches, its outermost feather three inches and a half less; wing five and a half to six inches; tarse an inch and five-eighths, but considerably less robust than that of *T. infuscata*. Inhabits the peninsula of India.\*

Centropus, Illiger. The variations of plumage exhibited by the birds of this genus are very remarkable, and appear oftentimes to be independent of age or sex. Having ascertained the identity of my C. dimidiatus, J. A. S. XII, 945, with C. lepidus, Horsfield, but which species will bear the prior name of C. Lathami, (Shaw), I was subsequently led to suspect that C. sinensis, (Shaw), J. A. S. XII, 247, might prove to be analogously identical with C. philippensis; notwithstanding the great difference of plumage in both cases; and upon more minutely examining the Society's Chusan specimen of C. sinensis, I found, on turning aside the feathers of the nape, some glossy steel-black ones just put forth, different in texture from the old plumage, and exactly according with those of ordinary adult philippensis; moreover, the two entirely correspond in size and proportion, and I feel now perfectly satisfied of their being one and the same.

In my description of C. philippensis, J. A. S. XI. 1099, it was mentioned that some of the young birds, in their first or nest dress, were throughout unbarred, being coloured much as in the ordinary adult, except that the rufous is less bright and is deeply infuscated upon the back, while most others of the same age are conspicuously barred throughout, as in a young Cuckoo. In general, these moult into the usual adult dress, figured by Horsfield as C. bubutus; but some would appear to assume a peculiar second dress (in which state it is C. sinensis), analogous to that of ordinary occurrence in C. Lathami, and which seems likewise to be analogous to the hepaticus plumage of Cuculus canorus, more frequent in Cuc. poliocephalus (v. himalayanus,

<sup>\*</sup> These three species of Taccocua appear more decidedly distinct, when seen together, than perhaps would be inferred from the above descriptions: some might deem them local varieties merely of the same, in which case intermediate specimens should occur in intermediate districts; but even then races so nearly allied might perhaps have intermingled, like Coracias indica and C. affinis; but to me they certainly appear as distinct as Alcedo grandis, A. ispida, and A. bengalensis.

Vigors), in Cuc. tenuirostris, Gray, and its Malayan near ally, Cuc. merulinus (v. flavus). Raffles was aware of this variation of plumage in Centr. Lathami, which he identifies with Cuculus tolu, Auct., (a Madagascar species, or more probably variety of several alleged African species, all of about the same size, as Centr. maurus, C. rufus, and C. senegalensis, Auct.,) which it undoubtedly makes a near approach to in the instance of some specimens; but he certainly reverses the order of progression in the states of plumage, in his remarks upon the latter, cited in J. A. S. XI, 1103. One young specimen, in undoubted nestling garb, I have described in XII, 945 (at the end of the footnote); the second dress (probably more frequent in the female sex) in XI, 1003; and the fully mature plumage as C. dimidiatus, together with the notice of the young: in a fine series now before me, from Bengal (vicinity of Calcutta), Cuttack, and Malasia, are some intermediate to what I have now specified as the second and third phases, but which were not killed during moult, the feathers themselves appearing as though they had been in process of changing colour; but I think it more likely that they had been put forth thus intermediate: these have the rufous back more infuscated, a greater or less number of the shafts of the feathers yellowish-white, on a black or rufous ground, according to the part, and in one instance many intermixed pale and barred feathers on the under parts, the black bars on some of these being enlarged and more or less tending to blot the entire The Polophilus Lathami of Shaw is decidedly a specimen in this imperfectly mature dress; the thoroughly mature garb differing only from that of C. philippensis in the less deeply rufous hue of the mantle and wings, but the species being readily distinguishable by its much smaller size, and the shorter and deeper form of the bill.

Analogous differences present themselves in the Centr. phasianus of Australia; and I doubt not in the alleged African species, of several of which I have suggested the identity, having no means of personally investigating the problem. In the Malayan islands, the Centr. melanops, Par. Mus., of Lesson's Traité, vide J. A. S. XII, 946, is probably also to be referred to C. Lathami; and C. bicolor, ibid., perhaps to the same, or to C. philippensis. A distinct species occurs in C. viridis, Scop., Lath., (founded on the Coucou vert d'Antique of Sonnerat,) v. C. affinis, Horsf., vide J. A. S. XIII, 391; and another in C. I sigalensis, Lath., (founded on the Lark-heeled Cuckoo of Brown's

20



Zoology,\*) v. C. pumilus, Lesson, vide XII, 945; but with these two I am unacquainted.

Of the species of Cuculus, I have now nothing further to add, than that I feel satisfied of the identity of C. nisicolor, Hodgson, J. A. S. XII, 943, with the common C. fugax: of C. micropterus, a particularly fine male has the wing as much as eight inches and a quarter long, and the rest in proportion; while of C. canorus, an equally fine male has the wing fully nine inches long; the general characters of the two birds, however-rendering them easy of distinction : of C. Sonneratii (v. pravatus, Horsf., v. rufovittatus, Drapiez), a specimen in nestling dress is altogether more coarsely barred than the adult, with pale rufescent upon a black ground above, the under parts white banded with dusky, and having the cross bars broader than in the mature plumage; bill but fifteen-sixteenths of an inch to gape, but the general resemblance to the adult still sufficient to indicate the species at a glance, the half-feathered tarse helping to characterize it apart from C. tenuirostris and C. merulinus: lastly, of Eudynamys, besides the Australian Coel, which was identified with that of India and the Malay countries by Messrs. Vigors and Horsfield, but which Mr. Swainson has separated (on account of its considerably larger size,) as Eu. australis, the Cuc. taitensis, Sparrman, of New Zealand and the South Sea Islands, is referred to this genus by Mr. G. R. Gray, (vide Appendix to Dr. Dieffenbach's 'New Zealand,' Vol. II, 193).

Caprimulgidæ. Three allied species of this tribe appear to have been lately confounded under the name Caprimulgus macrurus, Horsfield. These are—

1. C. albonotatus, Tickell, J. A. S. II., 580: C. gangeticus, nobis, mentioned in An. and Mag. Nat. Hist. 1843, p. 95; regarded as distinct from macrurus, Horsfield, in J. A. S. XII, 178 (bis),—but referred to macrurus in XI., 586, an identification in which Dr. Horsfield coincided. The size, however, of C. macrurus of Java is considerably smaller; and there is a closely allied species in Southern India, which, agreeing better in dimensions with the Javanese bird, I therefore presumed might be identical with the latter. Mr. Jerdon, who has treated critically of the Indian species of this genus in the

<sup>\*</sup> On the same plate is figured a "Spotted Curucui" from Ceylon, which is evidently the Cuculus (Chrysococcyx) lucidus.



second No. of his 'Illustrations of Indian Ornithology,' provisionally assented to this suggestion; but with proper distrust, "in a genus where the plumage is so very similar," remarked that the bird of Southern India might yet prove to be distinct, in which case he proposed for it the specific name atripennis: Mr. Strickland, however, has informed me that he had lately received from Mr. Jerdon "a specimen of his small C. macrurus from the Neilgherries, which evidently seems to be the same as Horsfield's macrurus"; yet it does not appear that the latter naturalist actually compared the two together, and the Society has now a distinct Malacca species which I feel very confident will prove to be the true macrurus of Horsfield, and I as little doubt that the species of Southern India is C. mahrattensis of Sykes. That immediately under consideration is acknowledged by Mr. Strickland to be quite distinct, and this naturalist has suggested for it the felicitous name gagateus, " from its rich agate-like markings:" of its identity, however, with the species named as above by Captain Tickell, I feel no doubt, although the statement of that observer that the sexes are alike, does not fully apply. It is a common bird in Lower Bengal during the cold season, and appears to be generally diffused throughout Northern India, but it has not been met with in the southern part of the country, where it would seem to be replaced by the next. A fine male of C. albonotatus measured thirteen inches long, by twenty-five in spread of wing; the closed wing nine inches, and tail seven inches: a small female eleven and a half, by twenty-one inches; wing eight and three-eighths, and tail six and five-eighths. The tarse (as in the others,) is anteriorly feathered nearly to the toes. This bird has the crown and tertiaries light cinerascent, minutely mottled, and marked with a stripe of black dashes along the middle of the crown: upper range of scapularies black, more developed in the male, and bordered, more broadly externally, with rufescent-white: lores and ear-coverts brown: wing-coverts black, mottled with rufous, and largely tipped with rufescent-white: a broad white patch in front of the neck, as in several allied species: there is a band of white on the primaries, contracted and rufescent in the female; and the two outer tail-feathers are broadly tipped with white in the male, and much less broadly tipped with slightly mottled pale rufescent in the female. Altogether the females are much paler, and browner or less asby, than the other



sex. The rictorial bristles are conspicuously white at base, and black for the remainder of their length.

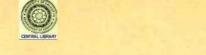
- 2. C. mahrattensis, Sykes, Proc. Zool. Soc. 1832, p. 83: C. macrurus apud Jerdon, Ill. Ind. Orn. (vide his description of C. indicus). Very similar to the last, but much smaller; a male now before me having the wing but six inches and a half in length, and tail four and three-quarters: in another the wing measured seven inches, and the tail five; but Mr. Jerdon assigns "about seven inches and a half" as the length of the wing, and "five and a half to six inches," as that of the tail. He adds, that he considers it may perhaps be the C. asiaticus, var., of Latham. In the only specimen before me, there is a russet tinge about the nape, back, and breast, not seen in the preceding species. Formerly, I regarded what Mr. Jerdon pronounces to be a mere pale individual variety of the variable C. indicus, as Sykes's mahrattensis; but looking more attentively to the description of the latter, the statement that the two outer tail-feathers are tipped with white, cannot refer to any variety of C. indicus, wherein the four outer tail-feathers (or all but the middle pair,) have subterminal white tips, the extremities being always dark. In other respects, I conceive that Sykes's description will apply sufficiently to the generality of specimens; particularly as he states that it "differs from C. monticolus and C. asiaticus, in the prevalent greyness of the plumage, and in the absence of the subrufous collar on the nape." Hab. Southern India.
- 3. C. macrurus, Horsfield, Lin. Trans. XIII, 142. To this I refer two Malacca males, and two Arracan females, in the Society's collection, which are intermediate in size to the two preceding, and are further distinguished by their much darker general colouring, and the males by having the primaries black to the end, instead of being mottled towards their tips. Wing seven inches and three-quarters in the males, and tail six inches: in the females, the wing measures seven and a half, and tail five and three-quarters: the males have the crown and nape dark brownish-ashy, minutely mottled, with black dashes along the middle of the crown, as in the preceding species, and the scapularies and wings are similarly marked with black, set off with bright rufous-white, the margins so coloured being narrower than in the others: breast and fore-part of the belly dark, and contrasting strongly with the light buffy tint of the hind-part of the belly, vent, and lower tail-coverts, which last tend to be whitish in one specimen, barred with



black: the primaries underneath have no rufous bars whatever, or mottlings either at base or tip, and these are but imperfectly developed towards the base of the tail underneath: but the white spots on the middle of the primaries, and largely tipping the two outer tail-feathers, are the same as in the others. There is also the same conspicuous white mark in front of the neck, which is represented by pale buff in the female. The latter is altogether browner and less ashy, particularly on the head and neck; but is still considerably darker than the males of the other species; the contrast of the dark breast and pale belly and vent is much less decided; the primaries are barred at base with rufous, and slightly so towards the tip, the white of the male being represented by a contracted rufous bar; and the two outer tail-feathers are also much more narrowly tipped, with rufescent instead of pure white. On comparison of these three species together, particularly with a good series of specimens, it is impossible not to regard them as distinct, however nearly allied.

The other Indian species are-

4. C. asiaticus, Lath.; C. pectoralis, Cuv., Levaillant, Ois. d'Afr., pl. XLIX, apud Dict. Class. ; Bombay Goatsucker, Latham. This small, common, and generally diffused species over the country, is allied in colouring to the three last, but has the tarse bare, and the sexes are alike in plumage. Mr Jerdon is "still inclined to believe that the species figured by Hardwicke and Gray as asiaticus, differs from the common kind. I obtained," he adds, "what answers to this very closely in the north of the Deccan. It differs from the common one in its larger size, more prevalent and lighter grey tint of the plumage, and in some other trifling points; but I have now no specimens for comparison." Could this have been C. mahrattensis? I certainly think there can be little doubt that Hardwicke's figure was taken from a Bengal specimen, and is meant to represent the common species. C. affinis, Horsfield, is a Javanese species allied to the present one, and this and macrurus are the only kinds noticed in Dr. Horsfield's list of the birds of Java; while, in Sumatra, Sir Stamford Raffles also speaks of but "two varieties, one with much brighter and more marked colours than the other. They are very abundant in the neighbourhood of Bencoolen." Different species of Lyncornis, as well as of Batrachostomus, are however common in the vicinity of the Straits, and the former of these would have been classed by Raffles in Caprimulgus.



- 5. C. indicus, Lath., Jerdon: C. cinerascens, Vieillot. This handsome species appears subject to considerable variation, in its dimensions, depth of colouring, greater or less development of the black on its upper-parts and inversely of the fulvescent-white upon the scapularies, wing-coverts, &c., and also in the amount of the rufous barring upon the primaries, which I think is generally less developed in the smaller specimens of both sexes: its tarse is feathered; and all the caudal feathers of the male, except the middle pair, have a white spot near the tip, which in the female is scarcely indicated. In general, these white spots have only a slight dark margin, tipping the feather; but in one variety before me, with wings as much as eight inches and a half long, the white on the tail-feathers is somewhat contracted in quantity, and has a dark border fully half an inch in breadth, tipping each feather\*. This species is, I think, commonest in the sub-Himalayan region, but it extends sparingly over India generally, and I have once known it to be shot in the neighbourhood of Calcutta.
- 6. C. monticolus, Franklin: Great Bombay Goatsucker, Latham. In this the male is distinguished by having its two outer tail-feathers on each side wholly white, to near the tip, whereas in the female these are barred throughout rufous and black. The female is also paler than the male; and both sexes are, throughout, more uniformly, minutely mottled ashy, than in either of the other species, this plainness of colouring being relieved by the pale rufescent hue of the borders of the middle scapularies, by a white throat-band in the male, considerably less bright and contrasting in the female, and by the white on the primaries and tail of the former. With C. asiaticus it accords in having the tarse naked, and a sort of collar surrounding the neck. I have twice obtained it near Calcutta, and it appears to be sparingly diffused throughout the country from the Himalaya southward; Capt. Abbott has also sent it from Arracan.

<sup>\*</sup> The specimen here adverted to is probably not Indian, but from the eastward; and may prove to be of a distinct species: and one Neilgherry specimen forwarded by Mr. Jerdon has also much the appearance of being distinct; in this, the ashy portion of the plumage is much more albescent than usual, contrasting strongly with the black, and there is scarcely a trace of rufous, except some broken bars of this colour at the base of the primaries; a row of whitish spots bordering the scapularies shew very conspicuously; the white spots on the tail-feathers are larger than usual; and the wing measures but seven inches and a quarter long: it is a remarkably handsome bird.



That very beautiful bird, the Lyncornis cerviniceps of Gould, extends so high as Arracan, where it is not very uncommon; and the Society also possesses L. Temminckii from Singapore. Bombycistoma Fullartonii, Hay, J. A. S. X, 573, is identical with Batrachostomus auritus, (V. and H.), Gould, which name it must bear; and with respect to the supposed Podargus (or rather Batrachostomus) javensis of Coorg, in southern India, noticed in XI, 798, Mr. Jerdon has since informed me that "it is not that species, but a smaller one, about eight or nine inches long; of which," he remarks, "I have seen a Malacca specimen. It is, I think, distinguished in Lesson's 'Manuel d'Ornithologie,' which I do not possess. I can perfectly trust to the descriptions I received of it, and hope yet to obtain specimens." Most probably it is the Podargus (now Batrachostomus) stellatus, Gould, Proc. Zool. Soc. 1837, p. 43, which, together with Bat. auritus and B. javensis (v. Podargus cornutus, Tem.), inhabits the Malay peninsula.

Cypselidæ. Swifts. To Mr. G. R. Gray is due the credit of first separating the Hirundo esculenta, Lin., (the constructor of the celebrated edible birds'-nests,) from the group of Swallows, and transferring it, as a new and distinct generic type, Collocalia, to that of the Swifts: and I can now announce a second representative of this type in the Hirundo unicolor of Jerdon, since regarded by him as a Cypselus, upon which I altered the specific name to concolor (J. A. S. XI, 886), as there was previously a Cypselus unicolor; but it must now rank as Collocalia unicolor, (Jerdon). From the true Swifts (Cypselus), the species of Collocalia differ in their considerably less robust general conformation, in their comparatively very slender tarsus and toes, and in having the hind-toe distinctly opposed to the three anterior toes. Mr. Jerdon "only found this remarkable species in the Neilgherries, and about the edges of the hills. It flise in large flocks, and with very great speed." The Society has also received it from Darjeeling. Is it, therefore, exclusively a mountain species, which constructs glutinous nests like the other, but in mountain caverns? Or does it resort, like its congener, to the caverns of cliffs overhanging the sea-shore during the breeding season, in this case being perhaps the constructor of the edible nests which are found on the western coast of the peninsula of India, as, for instance, in the group of small islands about eight miles west of Vingorla (which is 275 miles from Bombay), commonly known as the Vingorla rocks, where about a hundredweight of these nests are produced annually? To myself, who, long ago, following the accounts of the edible nests being constructed by a true Hirundo, found this a stumbling block to one of the distinctions which I drew between the Swallows and the Swifts, I confess it yielded some gratification to find my suspicions in this matter completely confirmed; for the nest of Cypselus apus of Europe is essentially similar to that of Collocalia esculenta, containing a large quantity of glutinous matter, which there can be no doubt is secreted by the very large salivary glands of the bird\*; whereas in Hirundo urbica, the nests of which species might be thought to present a marked analogy, the fabric is constructed of mud, or, as Vieillot remarks, worm-casts are selected for the purpose, and the birds may be commonly seen on the ground collecting material of the kind, many of them often resorting to the same wet place,-the Swifts, on the contrary, never descending to the ground The two groups of Swallows and Swifts present a very remarkable instance of what is termed analogy, or mere external and superficial resemblance, as opposed to affinity, or intrinsic physiological proximity. Though externally resembling in their adaptive characters, as a Cetal may be said to present a superficial resemblance to a fish, sufficient indeed to have occasioned the group to be still popularly classed with fishes, the difference between the Swifts and Swallows is analogous in kind, but inferior in degree, to that which necessitates the Whales and Porpoises to be removed altogether from among fishes: and the same intrinsical similarity in the essential structure, which compels us to arrange the Cetals in the class of mammalia, equally approximates the Swifts to the Trochilidæ (or American Humming birds), while the Swallow conformation is modelled on the ordinary passerine type, from which it deviates only in external modifications, having reference to mode of life. In the Swift, as in the Humming bird, the entire structure, alike as regards the rudimental anatomy and the external characters, concurs to produce the maximum of volar power; whereas n the Swallows there is no such general concurrence, but the potency of flight seems entirely due to the development of the wings and tail, the sternal apparatus in no respect differing from that

<sup>\*</sup> Vide Mag. Nat. Hist. 1834, p. 463 et seq. The nests there described passed into my possession, which enables me to state that the glutinous matter was in greater quantity than would appear from the account given by Mr. Salmon. The fact is, it constitutes the basis of a Swift's nest, by which is made to adhere the various light substances gathered in the air by these birds, when such are blown about on a windy day.



of a Sparrow, or a Robin, but retaining the peculiar configuration observable throughout the passerine type, in all its integrity. It would be out of place here to pass in review the principal details of conformation of the groups to which the Swifts and Swallows respectively belong, and to shew how essentially they differ in the whole skeleton, in the alimentary organs, that of voice, &c.; even to the structure of the feathers, and to the circumstance that the Swifts (like the *Trochilidæ* and *Caprimulgidæ*,) have never more than ten rectrices, while the Swallows have twelve, in common with the whole of the grand series of passerine birds, save one or two peculiar exceptions, of which the Drongo (or King-Crow) group is the most remarkable one. I shall conclude for the present by indicating the Indian species of Cypselidæ.

These fall under four generic heads.

Acanthylis, Boie, v. Chætura, Stephens: from which Pallene of Lesson, containing the Indian species, is placed separately by Mr. Gray, for reasons with which I am unacquainted. Mr. Hodgson, also, says of the Himalayan species, that it is "certainly not a Chætura as defined by Stephens. I have set it down in my note book," he adds, "as the type of a new genus, called Hirundapus," (a bad hybrid name, which holds priority over Pallene). Mr. Swainson, however, had long previously figured the same bird as a true Chætura, from which genus I cannot perceive in what it differs.

1. Ac. gigantea, (Tem.) Inhabits the Malay countries, extending northward to Arracan, where it is of rare occurrence; it also occurs in the Neilgherries. Chin albescent, but not forming with the throat a large pure white patch, as in the next species; and the spinous tail-feathers are much stouter, with their webs tapering, and not terminating abruptly as in the other.

2. Ae. caudacuta, (Lath.): Hirundo fusco, Shaw; Chætura australis, Stephens; Ch. macroptera, Swainson; Ch. nudipes, Hodgson, J. A. S. v. 779; Cypselus leuconotus, Mag. de Zool. 1840, Ois., pl. XX, and figured in the Souvenirs, &c. of M. Adolphé Delessert, pt. 11, pl. 1X,

<sup>\*</sup> The Himalayan bird is certainly the macroptera of Swainson; and as this is given as a synonym of Latham's caudacuta by Mr. Strickland, (An. and Mag. N. H. 1843, p. 337,) on the authority of the drawing upon which Latham founded his description, now in the possession of the Earl of Derby, I of course bow to the decision of that naturalist; though Latham's statement that it has the "forehead white, and throat very pale dusky," certainly applies better to Ac. gigantea of the Malay countries.



p. 25. Himalayan; and said to be the same as the Australian species, though I question if specimens have ever been actually compared.

Cypselus, Illiger. Ordinary Swifts.

- 1. C. melba, (L.): C. alpinus, Tem. Neilgherries, Travancore, &c.; also Southern Europe.
- 2. C. pacificus (? Lath.): C. australis (?), Gould, Proc. Zool. Soc. 1839, p. 146; vide J. A. S. x1, 886. Penang.
- 3. C. leuconyx, nobis. Closely allied to the last, and described from a Deccan specimen in J. A. S. xi, 886: a Calcutta specimen (being the only one which I have yet heard of) flew into the window of a house in Garden Reach, and was obligingly presented to the Society by Willis Earle, Esq. It minutely agrees with my description of the other, except that the wing is a quarter of an inch longer. The marked difference in size of foot from the preceding species forbids their being considered of one kind.\*
- 4. C. affinis, Gray, Hardwicke's Ill. Ind. Zool: C. nipalensis, Hodgson, J. A. S. v. 780. India generally; very common about Calcutta.
  - 5. C. palmarum, Gray, ibid. India generally; common. Collocalia, G. R. Gray.
- 1. C. unicolor, (Jerdon): Cypselus concolor, nobis, J. A. S. XI, 886.

  Darjeeling; Neilgherries.
- 2. C. esculenta, (Lin.) Malay coasts: common in the Nicobar islands; and Captain Phayre informs me that "it is to be had on the rocky islands off the southern part of the coast of Arracan:" it also (or possibly the preceding species, vide p. 210,) breeds along the Malabar coast, and so far northward as the Vingorla rocks.

Macropteryx, Swainson.

M. klecho, (Raffles): Cypselus longipennis, Tem. Central and Southern India, and Malay countries.

Mr. Swainson gives, as a second species, the Sumatran Cypselus comatus, Tem., which I have not seen; and as a third, C. mystaceus, (Lesson,) who applies the name Pallestre to the genus.

July 12th, 1845.

E. B.

<sup>\*</sup> There is a Cypselus vittatus, from China, figured in the 2nd series of Jardine and Selby's 'Illustrations of Ornithology,' which I believe is allied to C. pacificus (?) and C. leuconyx; but it has the tail forked to the depth of an inch.



Observations on the rate of Evaporation on the Open Sea; with a description of an Instrument used for indicating its amount. \*By T. W. Laidley, Esq.

It has often occurred to me, that a simple and convenient instrument for ascertaining the actual amount of exhalation from a humid surface, could not fail of being essentially \*serviceable to meteorological science, as well as to the arts. An instrument for this purpose was indeed contrived by the late Professor Leslie, to which he gave the name Atmometer: but though very ingenious, and fulfilling tolerably well the intentions of the inventor, it fails in a very important qualification of scientific instruments, simplicity of construction and use; and is consequently less frequently employed in observing the condition of the atmosphere in reference to dryness and humidity than is desirable. The instrument is thus described by its inventor: "The Atmometer consists of a thin ball of porous earthenware, two or three inches in diameter, with a small neck, to which is firmly cemented a long and rather wide glass tube, bearing divisions, each of them corresponding to an internal annular section, equal to a film of liquid that would cover the outer surface of the ball to the thickness of the thousandth part of an inch. The divisions are marked by portions of quicksilver introduced, ascertained by a simple calculation, and they are numbered downwards to the extent of 100 to 200; to the top of the tube is fitted a brass cap, having a collar of leather, and which after the cavity has been filled with distilled water, is screwed tight. The outside of the ball being now wiped dry, the instrument is suspended out of doors, exposed to the free access of the In this state of action the humidity transudes through the porous substance just as fast as it evaporates from the external surface; and this waste is measured by the corresponding descent of water in the stem. If the Atmometer had its ball perfectly screened from the agitation of the wind, its indications would be proportional to the dryness of the air at the lowered temperature of the humid surface; and the quantity of evaporation every hour as expressed in thousand parts of an inch, would when multiplied by 20 give the hygrometric measure. The Atmometer is an instrument evidently of extensive application, and of great utility in practice. To ascertain with accuracy and readiness the quantity of evaporation from any



surface in a given time, is an important acquisition, not only in meteorology, but in agriculture and in the various arts and manufactures. The rate of exhalation from the surface of the ground is scarcely of less consequence than the fall of rain, and a knowledge of it might often direct the farmer advantageously in his operations. On the rapid dispersion of moisture depends the efficacy of drying houses, which are often constructed most unskilfully, or on very mistaken principles."

The instrument which I have found to answer extremely well, consists of a glass tube the bore of which must be equable, and may vary from one or two-tenths of an inch in diameter to a much larger size, according to the pleasure of the constructor. If the bore be not quite equable, its varying capacity must be ascertained and allowed for on the scale to which it is to be attached. One end of this tube, after being ground quite flat and smooth, is to be closed with a porous substance, which space permits the free transudation of water, but yet not so freely as to accumulate in drops or to fall. I find that common cedar wood possesses the requisite quality, and forms a plug which swells so as to become water-tight; and by its porous structure permits the fluid to permeate as rapidly as the atmosphere removes it from the exposed surface. The tube thus prepared, and filled with distilled water, is to be attached to a scale divided into fiftieths or hundredths of an inch, upon which as the evaporation proceeds and the column of fluid descends, the daily amount of evaporation may be conveniently observed. No other precaution seems necessary in using this Atmometer than to supply it with very pure rain or distilled water; for any saline matter it might contain would be deposited upon the evaporating surface, and would interfere very materially with the result. prevent error from this source, the entire tube should be very frequently (say every time that it is filled,) washed in a quantity of clean water to remove accidental impurities; and the cedar plug occasionally renewed.

The following observations made with this instrument on board of the ship "Southampton," on her recent voyage from England to Calcutta, showing the rate of evaporation on the open sea in tropical latitudes, may not be altogether uninteresting to such as are curious in oceanic meteorology. The instrument was suspended in a shaded part of the vessel, exposed freely to the action of the wind.



APINITALITY (A	Latitude.	Longitude.	Barometer.	Thermome- ter.	Evaporation in inches.
HA FIRSTERN N	0 /	0 /	SHE DRIVE	THE STATE OF THE S	THE REAL PROPERTY.
October 3	37 15 S	40 31 E	29.90	62	0.40
4	37 13	44 05	30.13	63	0.40 0.38
5	37 19	47 50	30.10	64	0.55
67	37 09	51 51	30.05	66	0.33
7	36 38	56 14	30.08	56	0.40
Table of 8	35 58	59 50	30.12	58	0.45
	35 39	62 21	30.16	61	0.40
10	34 46	67 19	30.14	62	0.40
11	33 24	71 47	30.02	63	0.41
11000 112	31.51	76 04	29.94	63	0.35
13	30 27	79 05	30.09	*66	0.38
CHES DON'T	28 54	82 37	30.16	69.5	0.37
15	26 14	84 25	30.18	71 71.5	0.39
16	24 25	86 10	30.19	71.5	0.60
17	23 02	86 14	30.24	72	0.62
	21 06	86 18	30,10	73	0.72
20	18 25	86 34	30.11	76	0.68
21	16 39 14 42	86 36	30.10	77.5	0.70
22	11 07	86 54	30.11	81	0.70
-0.000 2313	7 39	86 54 86 34	30.00	82	0.78
24	3 57		30.09	84	0.80
25	2 08	87 10 87 19	30.05 30.04	84.5 83.5	0.82
26	1 09N	87 57	29.97	81	0.75
27	4 19	89 32	30.00	82.5	0.86 0.98
28	641	90 16	30.00	84	1.00
29	7 58	90 40	30.00	84.5	1.06
df el 20 39	8 50	90 52	30.02	81.5	0.88
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November 1	10 55	90 15	30 00	84	0.93
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THE PERSON TO	18 52	88 45	30.02	83	0.68
retempont8	19 23	88 53	30.10	83	0.88
	19 18	89 37	30.00	82	1.15
110	19 56	89 43	39.00	82	1.25
ll a	20 37	89 00	30.00	81	1.24
12	20 54	89 12	29.95	80	1.32
13	Sandhea	ds.	29.98	80	1.04

The reader will perhaps be surprised at this high rate of evaporation on the open sea, differing as it does so widely from that deduced by M. Von Humboldt from his own observations with the hair hygrometer. That accomplished observer gives the following results, calculated from a formula of M. d' Aubuisson, which does not however appear to meet all the circumstances of the case.

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Latitude N.	Thermometer, (Cent. grade.)	Hygrometer.	Quantity of water evaporated per hour in millimetres.	
0 /		•	Allow 6 Malk	
39 10	14.5	82	0.13	
30 36	20.0	85.7	0.14	
29 18	20.0	83.8	0.16	
18 53	21.2 .	81.5	0.20	
16 19	• 22.5	88	0.13	
12 34	24.0	89	0.13	
10 46	25.4	90	0.12	
111	25.0	92	0.09	

"It follows from these researches," says M. Von Humboldt, "that if the quantity of vapour which the air commonly contains in ourmiddle latitudes, amounts to about three-quarters of the quantity necessary for its saturation, in the torrid zone this quantity is raised to nine-tenths. The exact ratio is from 0.78 to 0.88. It is this great humidity of the air under the tropics, which is the cause that the evaporation is less than we should have supposed it to be from the elevation of the temperature."

These inferences seem scarcely compatible with the actual indications of my instrument. But it must be observed, that besides being imperfect as a hygroscope, De Luc's instrument takes no cognizance of the important agency of the wind in promoting evaporation. So far from diminishing, the exhalation from the surface of the sea would appear to augment very rapidly as we approach the torrid zone: my observations exhibiting a daily average of 0.398 in. from latitude 37° 15' S. to latitude 24° 25', and of 0.809 in. through the tropics.

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On the Alpine Glacier, Iceberg, Diluvial and Wave Translation Theories; with reference to the deposits of Southern India, its furrowed and striated Rocks, and Rock basins. By Captain Newbold, M. N. I., F.R.S. Assist. Commissioner Kurnool, Madras Territory. With a plate.

The geological reader in looking over the published remarks of observers on the geology of Southern India, can hardly fail being struck with the almost utter absence of any notice of a boulder or drift formation, analogous to that which prevails to a great extent over the surface of the northern parts of Europe, and in the higher latitudes of the opposite hemisphere. Nor has any undoubted testimony been hitherto laid before the geological world as to the existence in Southern India of the polished surfaces of rocks, grooves, parallel striæ, perched blocks, truncated conical mounds, tumuli, and long ridges of gravel, which have been so conspicuously pointed to in Europe by Agassiz and others, as unquestionable evidences of the overland march of glaciers conveying boulders, gravel, sand, and loam to great distances.

Charpentier and Venetz were the first, I believe, to promulgate the theory-that ancient Alpine glaciers extended far beyond the present limits of glaciers from the Alps to the Jura, and were the means of conveying the gigantic angular granite and crystalline blocks of the former chain, to the strange position they now occupy on the limestone slopes of the latter ridge, over the intervening valley, which is one of the deepest in the world and upwards of 50 miles in width. To account for the extension of glaciers across this valley to the Jura, now entirely destitute of glaciers, M. Charpentier supposes the elevation of the Alps to have been much greater than now: and it appears certain that moraines, striæ, and furrows, considered to be indubitable marks of glacial action, can be traced in the Alps to great heights above the present glaciers, and to great horizontal distances beyond their lower limits. The Jura, which is only about one-third of the average height of the Alps, presents similar marks of glacial action to the Alps, although now entirely destitute of glaciers.

It was subsequently objected, that the phenomena of erratic boulders extend over the northern and more temperate zones of Europe, Asia and America, in flat tracts, and consequently could not be ac-



counted for by so local a cause as the former greater elevation of the Alps.

To explain these difficulties, M. Agassiz repudiates the former greater elevation theory; and supposes a former colder state of climate prevailing over the countries, in which the phenomena of boulders are found, and which covered them, as is now the case in Greenland, with sheets of ice and glaciers.

He supposes that most of the large longitudinal beds of unstratified gravel we see in the North and West of England, Scotland and Ireland, to be the lateral moraines, and the conical truncated mounds and insulated tumuli to be the terminal moraines of ancient glaciers, (left by their retreat, and not pushed forward by them as supposed by Charpentier,) broken and washed by debactes occasioned by the thawing of the ice, masses of which were thus drifted in diverging directions, conveying the large insulated angular masses of rock called erratic blocks to the strange situations we now see them occupying.

Circles of such angular blocks seen round the summits of conical peaks are supposed to be occasioned by the glaciers lodging on it and melting on it. They are usually called perched blocks.

The rounded or bouldered blocks and gravel are supposed to have been produced by the trituration of the masses of ice and glaciers upon the subjacent surface, and the angular blocks which are found on the surface of the rounded materials, to have been left there by the melting of the ice. The interstratified deposits of mud, gravel and sand are considered to be a re-arrangement of the smaller materials of a moraine produced by the water resulting from the melting of a glacier. M. Agassiz observed polished surfaces, furrows, cavities, and striæ in the rocks of England, &c. where the boulder formation exists, similar to those in the Alps, and considers them also as proofs of the former existence of glaciers in those now temperate regions.

The longitudinal furrows, &c. were observed by Seffström and others to have a general direction of N. W. and S. E. in the rocks of Lapland, Norway, and Sweden; which, added to the circumstance of blocks of granite confessedly from the mountains of Scandinavia being found imbedded in the boulder and drift of the eastern coast of England and Scotland, over Russia and Germany to the borders of Holland, and other reasons, induced many distinguished geologists to suppose the



boulder deposit to have been produced by a deluge, or great oceanic wave from the north. These parallel furrows were supposed to have been caused by the passage of gravel propelled by this great current, and hence called "diluvial schrammen."

Bötlingk, however, has observed that some of these Scandinavine furrows have centres of dispersion (like those formed by modern glaciers on the Alps,) conformable to the major axis or longitudinal direction of each valley. In the south of Sweden, he says, the striæ incline southerly; but on the east of Lapland northerly to the Icy ocean; he states, the general direction of the striæ on the summits of Scandinavia to be from N. W. to S. E. Those also in North America observed by Professor Hitchcock, have a similar direction.

M. Agassiz repudiates this diluvial theory as applicable to the drift and parallel furrows on the rocks of England and Scotland, which he states to diverge every where from the central chains of the country, following the course of the vallies; and that the distribution of the blocks and gravel follows similar directions, each district often having its peculiar debris traceable in many instances to its parent rock at the head of the valley. Hence, he infers, the cause of the transport must be sought for in the centre of the mountain ranges, and not from a point without the district. The Scandinavian blocks in the drift of England, he confesses, may have been transported on floating ice.

M. Agassiz does not deny the power of water to produce the furrows, and polishing of rocks in sitû; but states he has not been able to find them on the borders of rivers, lakes, and on sea coasts; that the effects produced by water are sinuous furrows proportioned to the hardness of rocks; not even, uniform, polished surfaces, such as those presented by rocks acted upon by glaciers having both loose gravel under them, and pebbles and pieces of rock firmly set in their lower surface like teeth in a file, and which are independent of the composition of the stone: for, he states, wherever the moveable materials, which are pressed by the ice on rocks in sitû, are hardest, there occur independent of the polish, striæ more or less parallel in the general direction of the movement of the glaciers. Thus, in the neighbourhood of glaciers, are found those polished round bosses which Saussure distinguishes by the name of 'roches moutonnés.' The most striking fea-

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tures in the distribution of Alpine glacial striæ are thus diverging at the outlets of the vallies, and their being oblique and never horizontal on the flanks, which they would be, were they due to the agency of water, or floating masses of ice.

The cause of their obliquity M. Agassiz ascribes to the upward expansion of the ice by the freezing of the water infiltered into the crevices and pores of the glaciers, and the descending motion of the glacier itself which he considers produced by this expansion of the mass and its gravitation.

From the resemblance in shape, and the interior arrangement of the beds of the so-called diluvium of England, France and Germany, that of the moraines confessedly produced by existing Alpine glaciers; from the presence on these rocks of furrows, &c. resembling those now produced at the bottom of moving glaciers; their radiation from mountain centres of elevation and coincidence of direction with that of the vallies down which glaciers would descend; their obliquity just described, and from the existence on the Jura limestone of basin and funnel-shaped cavities, and small indentations similar to those seen forming at the bottom of glaciers by small and temporary cascades descending through cracks and chasms in the ice, and from the association in those regions of these Alpine phenomena, which M. Agassiz contends are inexplicable on any theory of aqueous action apart from ice; he infers, as already stated, that very large portions of the now temperate regions of the globe have for a long period been covered with ice and snow.

A few shells of an arctic character, which have been found in the boulder deposits of Scotland and North America in addition to the above, constitute all the evidence we have of the period of intense cold, on which rests the Alpine glacial theory as applicable to the boulder deposits; and which M. Agassiz ingeniously imagines, accounts for the extinction of the mammoths which flourished in the warm period immediately antecedent, and the appearance of their frozen remains in arctic glaciers. The frozen period was followed by the more temperate human epoch.

The views of M. Agassiz on the origin of the boulder deposit have met with powerful support from Dr. Buckland, and partially from Mr. Lyell.

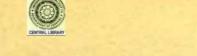


Mr. Murchison, the late distinguished President of the Geological Society, and M. Vernenil, reject the Alpine glacial theory, considering it as totally inapplicable to the boulder formation overspreading great part of Russia; the large granitic and other crystalline blocks of which (previously alluded to) have attracted so much attention from the days of Pallas up to the present time. These blocks, which have all been evidently derived from the North, are shown to have been deposited under the sea, or in other words, on a sea bottom, since they cover marine shells of the post-pleiocene period. The smaller blocks of the detritus are in general carried to greater distances than the larger; the distance being sometimes 1000 miles from the parent beds to the N. W. As in the English deposits, although a large proportion consisted of material brought from a distance, yet it contained a considerable portion of the detritus of the subjacent and adjacent rocks, the nature of which was often indicated from the colour of the superficial clay and sand. Mr. Murchison and M. Vernenil observed no instance of any substance having been transported from S. to N. except by the modern action of streams, and by local causes dependent on the present configuration of the land.

In room then of the Alpine glacial theory these authors substitute that of Icebergs. They believe that these great blocks have been transported on floating icebergs set adrift from ancient glaciers supposed to have existed in Lapland and the adjacent tracts; from the northern chains of which the blocks were originally dislodged and impelled southwards into the sea of that period, in which the post-pleiocene shells they are now seen to rest upon were accumulated.

They did not observe any parallel striæ or polishing of the surfaces of the rocks of Central Russia, but describe the most southerly of the scratches which came under their notice near Petrazowodsk on the Lake Onega.

They consider these marks may have been caused by the ice-floes - and detritus dislodged and set in motion by the elevation of the northern continental masses, grating upon the bottom of the sea; since, if they were caused by the overland march of glaciers, the glaciers must have been propelled from lower to higher levels, which is against what they conceive to be an axiom, viz., that the advance of every modern glacier depends on the superior altitude of the ground behind it.



Mr. Darwin's researches in the opposite hemisphere show, that the boulder formation, with all its European features, exists over extensive regions of South America; in the plains traversed by the Rio Santa Cruz (Lat. 50° S.); Tierra del Fuego,-including the Straits of Magellan and the Island of Chiloe (Lat. 43° S., Long. 73° W.) Mr. Darwin, in order to account for the interstratification of regular beds, the occasional appearance of stratification in the mass itself, the juxta-position of rounded and angular fragments of various sizes and kinds of rock derived from distant mountains, and the frequent capping of gravel, follows Mr. Lyell in believing that floating ice charged with foreign matter has been the chief agent in its formation; but, he adds, it is difficult to understand how the first sediment was arranged in horizontal laminæ; and coarse shingle in beds; while stratification is totally, and often suddenly, wanting in the closely neighbouring till, if it be supposed that the materials were merely dropped from melting drift ice; and he is disposed to think that the absence of stratification, as well as the curious contortions described in some of the stratified masses, are mainly due to the disturbing action of the icebergs when grounded.

He believes also, that the total absence of organic remains in these deposits may be accounted for by the ploughing up of the bottom by stranded icebergs, and the impossibility of any animal existing on a soft bed of mud or stones under such circumstances. In conformation of the disturbing action of icebergs, Mr. Darwin refers to Wrangel's remarks on their effects off the coast of Siberia.

Professor Hitchcock, and more recently Mr. Lyell, have made us acquainted with the great extent of the boulder formation in North America accompanied by parallel striæ, and rounded and polished surfaces of the harder rocks in sitû; also vast longitudinal mounds and detached tumuli of detritus. The prevailing direction of the striæ observed by the former, as before observed, assimilated to that of the furrows on the Scandinavian rocks, viz., from N. W. to S. E.

The advocates of the iceberg theory consider these ridges and mounds of unstratified gravel (the moraines of the glacialist) to have been the wreck of icebergs freighted with the detritus of circumpolar rocks, and stranded on the shores of seas, estuaries, or lakes; or as having been deposited in deep water by floating icebergs melting as they approached warmer seas. The interstratified deposit, and occasional

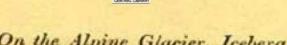


appearance of stratification in the mass itself is supposed to be occasioned by a re-arrangement of these materials by subsequent aqueous currents, which are also referred to as having given to the mass the configuration of longitudinal reefs, or truncated mounds.

It is well known, that the present general course of existing icebergs is from the polar regions towards the equator. These icy masses, as we glean from the writings of Scoresby and other navigators, are seen drifting in the open seas—laden with beds of rock and stone, brought from polar regions, the weight of which has been conjectured at from 50,000 to 100,000 tons, which are deposited as they dissolve either on the bed of the ocean, on the coasts, or when they ground. The breadth of one of these icebergs was about 15 miles.

A recent letter to Colonel Sabine from an Officer of the Antarctic expedition, states, that in Lat. 79° immense cliffs of ice were met with, forming the sea borders of an enormous glacier, above which, at a great many miles distance, the top of the mountains were visible. The ice-cliff was constantly breaking and tumbling down, and the disjointed masses congregated and floated away towards the equator to 60° S. Lat., where an enormous extent of iceberg was constantly to be found floating, and not fixed to any submarine ridge. Here they were constantly depositing by dissolution immense quantities of stones, earth, and other materials brought from the distant antarctic mountains. Still more recently, Mr. Hopkins the mathematician, supported by Professor Sedgwick, accounts for much of the drift on the flanks of the Cambrian chain without invoking the aid of glaciers or icebergs, by the hypothesis of the transporting forces of diverging waves of an ocean consequent to the elevation, or paroxysms of elevation, by which the mountains were raised from its bed. Such waves he terms " waves of translation," because they are found not to rise and fall like common waves, but wholly to rise, and maintain themselves above the level of the water. The powers of such waves. have been reduced to laws by the experimental researches of Mr. Scott Russell, which prove that a sudden elevation of a solid mass from beneath the water causes a corresponding elevation of the surface of the fluid, which infallibly produces a wave of translation of the first order.

Arguing that this wave is propagated with a velocity which varies with the square root of the depth of the ocean, Mr. Russell determines



the velocity of wave transmission, and that the old idea of the power of waves extending only a little way down in the sea is not true as touching waves of translation,-the motion and power of which is nearly as great at the bottom as at the top.

He further demonstrates, that the motion of this wave does not fluctuate, but is continuous and forward during the entire transit of its length; hence a complete transposition is the result of its movement: and the wave of translation, he says, may be regarded as a mechanical agent for the transmission of power as complete and perfect as the lever or inclined plane.

Reasoning from such data, Mr. Hopkins states, that currents of 25 and 30 miles an hour may be easily accounted for, if repetitions of elevations from 160 to 200 feet be granted; and with motive powers producing a repetition of such waves he infers, from mathematical and mechanical arguments, that there would be no difficulty in transporting to great distances masses of rock of larger dimensions than any boulders in the north of England.

Mr. Hopkins has also shown by mathematical analysis, that the overland march of glaciers over large and flat continents is a theory founded on mechanical error, and involves conclusions irreconcilable with the deductions of collateral branches of physical science.

Such is a brief abstract, derived principally from the Geological Society's Proceedings of the theories which divide the geological world at home regarding the boulder formation. General Briggs, perceiving that India was silent, while Europe, part of Asia, and America in both hemispheres, were contributing to the general stock of knowledge on this head, applied to some of the local authorities in the East to lend their aid in eliciting information, and among others to the Marquis of Tweeddale and General Fraser, to whom I have already transmitted some memoranda on the subject, at their request.

On mature consideration, however, I am of opinion that the mode I have adopted, of publishing an abstract of the theories on the subject which agitate geologists, with a notice of the leading feature of the principal alluvial deposits of Southern India as far as hitherto known, followed by a short description of the characteristics of the true boulder formation, by which it may be recognized when found in Southern India, and a list of the chief points to which the observer's attention should be directed in gaining useful information on this head,



in language free, as far as possible, from scientific terms, will serve more effectually towards the carrying out General Briggs's views.

Existence of erratic Blocks and Boulders in Southern India.

It was Brongniart, I believe, on the authority of M. de la Luc, who first spread among the Savans of Europe the idea that the rounded blocks of granite around and in the vicinity of Hydrabad in the plains of the Deccan were true erratic boulders; but after a close and extended examination of them, and of the rocks for many miles around, I am convinced that these blocks are in sitû (in place,) or nearly so, since they invariably rest upon, or near a granite of the same petrographical character; and that they owe their prevailing globular and rounded form to a process of spontaneous concentric exfoliation which I have endeavoured to explain in a paper published in the Journal of the Royal Asiatic Society for 1840.

The granite and limestone blocks at Puttuncherroo near Hydrabad, around Bangalore, Bellary, and in the Carnatic, wherever examined closely, I have found to be of precisely similar origin.

The formation in all these localities is one of granitic rocks, gneiss, and other contemporaneous crystalline schists, penetrated by dykes of basaltic greenstone, varying in structure from compact basalt to crystalline and porphyritic greenstone. The disposition of the last rock to assume a globular or spheroidal shape in weathering is still more remarkable than in the granite, which is often seen in rhomboidal and cuboidal masses, the angles of which are first blunted, and then rounded off by the exfoliation.

The Hydrabad granite blocks are seen lying singly, in confusedly piled heaps, or resting as tors or logging stones on bare bosses of a similar granite; and sometimes buried or half-buried in a soil formed by their own weathering.

At Lunjabunda, in the Kurnool district, I observed a single globular mass of granite about 18 feet in circumference, resting on a bare boss of the same rock, from which apparently the slightest touch would send it rolling to a considerable distance in the plain, and of which the subjoined diagram may serve to convey some idea. (See plate, Diagram, No. 1.)

The globular block A, is cemented to the boss beneath it B, by a paste a, arising from the decomposition of the granite itself, a felspathic



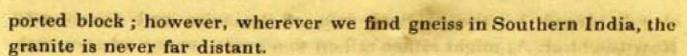
clay hardened by the oxidized iron of the mica and hornblende. Now the block A, might either roll on to a gneiss, or any other crystalline schist at C, or become buried in the alluvion at D. It might be set in motion not only by a stroke of lightning or an earthquake, but by process of its own weathering or that of the boss beneath it, or the washing away by the rain of the cement. The distance to which it might roll would be in proportion to the height and inclination of the boss on which it rests, the slope of the plane at its base, and its own weight and roundness.

In some cases the very rocks from which these globular masses originated, and on which they rested, have weathered faster than the block itself, and have crumbled into the mounds of angular gravelly detritus so common over the whole granitic area of Southern India, known to native cultivators and well-diggers under the names of Mhurrum and Ghurrus, in contradistinction to the nodular limestone gravel called Kunker.

Amid this granitic gravel evidently formed in sitû, in some places near 80 feet deep, are occasionally found the hardest spheroidal nuclei of granitic and basaltic rocks. These blocks have longer resisted the decay which has worn down the rock of which they once formed veins or dykes. Such is also the case in the angular gravel arising from the weathering of gneiss and the other crystalline schists, in which granitic and basaltic greenstone so extensively occur in the shape of dykes or veins.

That this gravel has not travelled far is evident from the angular nature of its component fragments, and that it is not the transported angular gravel of a moraine, or iceberg, is evident from the fact of veins of quartz, extending into it from the less weathered portions of the subjacent granite, or crystalline schists from which it is derived. The vein A A, in the diagram is of quartz, which though crumbling like white sand under the pressure of the fingers, is still seen to preserve its relative place and proper direction in the gravelly detritus above B, from the subjacent gneiss. (See plate, Diagram, No. II.)

Ovoidal fragments of granite sometimes occur imbedded in gneiss at considerable distances from any surface granite, which when exposed by the decay of the imbedding rock, might in an apparently exclusive gneiss area be difficult otherwise to account for than as a trans-



Dr. Benza is inclined to consider the blocks of granite seen scattered on the table-land of Mysore about Golcondapatnam, from the confused nature of their arrangements and the circumstance of no hills of any magnitude being apparent, as erratic boulders: but those which I examined in this locality proved to be out-croppings of granitic veins or dykes in the gneiss which bases this plain, deserted by the softer and more easily weathered imbedding schist. Granite and greenstone are abundant in the surrounding country; and even when not apparent, its existence must always be suspected in the hypogene areas of Southern India. It must also be borne in mind, if ever granite blocks are found at great distances from the rock whence they were derived, that the surface of India, like that of other countries, has been subjected to waves of translation caused by elevation to the surface.

Insulated blocks, knobs, clusters of granite, like those in the gneiss and granite plains of Hydrabad, Mysore and the Carnatic, have never been observed on the surface of the extensive diamond limestone and sandstone patches of Cuddapah, Kurnool and the South Mahratta country:—and only one small fragment of the former rock on the granitic and hypogene areas, at the base of the Neilgherries by Dr. Benza, which alone cannot be pronounced with any certainty as a true boulder, or transported pebble, as it may have been dropped from the collection of a traveller.

It will be proper to observe, that the Hindus like the ancient Egyptians, in the construction of their temples and statues, manifest a partiality for granite and basalt; blocks of which they will convey to great distances, if quarries should not happen to be at hand. I have seen a pagoda entirely built of granite amid the Moslem ruins of Bijapore, which is situated on a plain of the overlying trap 16 or 17 miles from the nearest granite rocks.

The Egyptians, who had the advantage of easy water carriage, transported enormous blocks of granite from the quarries of Syene to Lower Egypt. In the desert, as in the jungles of India, are frequently seen fragments of this rock scattered on the sands—the only remaining vestiges of former structures, and many miles distant from the parent rocks.

The tabular summits of the diamond sandstone and limestone in Southern India are often covered with rounded pebbles, which an examination always proved to be those loosened out of the sandstone pudding stones in weathering.

Diamond gravel. Beds of gravel, in which I have observed transported pebbles which could not be accounted for by causes now in action, occur in the valley of the Pennaur underlying a steep bed of regur, and in other diamond tracts. The diamond is found often as a transported pebble in this gravel; and pits are sunk through the regur to it. It is stratified, and bears more resemblance to the gravelly beach of a lake in the size of its pebbles, &c. than to the incongruous mass of a boulder bed. It rarely exceeds a couple of feet in thickness.

River terraces, &c. Along the courses of the great rivers of India, for instance that of the Bhima, are occasionally seen river terraces and beds of gravel beyond the highest present floods and inundations. Some of these may be owing to shifts in the course of the rivers themselves, but others indicate the passage of more extensive currents of water than at present.

Captain Allardyce informs me, that the Moyar valley, a mile or more in breadth at the base of the Neilgherries, bears evident marks of having been once the channel of a river, now only visible in an insignificant stream, which even in the monsoon does not occupy one-hundredth part of its breadth. There are beds of sand and gravel in the cross valley of Baugapilly, through which a rivulet cuts its way, which could never have deposited this gravel on the summit of the Ghauts. Captain Allardyce writes me, that traces of a diluvial current exist on the summit of the Neilgherries, upwards of 6,000 feet above the ocean's level; that the gravel and loam there are arranged in such a manner, as could only take place by deposit from water, the gravel being lowest, in a thin distinct and separate stratum, with the lighter loam covering it to the thickness of several feet.

Lateritic gravel. Beds of a red ferruginous gravel, principally derived from the true laterite, for which they have been mistaken, exist on the table-lands, near the flanks of the Ghauts and in the maritime plains at their bases; but none of them assimilate the character of the European boulder formation. Some of them are recent alluvia, but



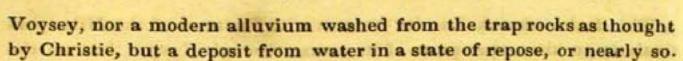
others are evidently derived from the denudation the laterite has been subjected to during the elevation of the land.

Sand beds of Baroche underlying the Regur. Beds of a yellowish brown micaceous sand, I am told by Professor Orlebar, underlie the regur near Baroche, extending inland as far as Ahmednugger, in which no fossils have been found.

The Black clay of Coromandel. The cities of Madras and Pondicherry, and other places on the Coromandel Coast, stand on an alluvium which overlies beds of bluish black clay, interstratified with layers of sand and reddish clay. The surface black clay imbeds marine shells of existing species.

These beds sometimes extend several miles inland. The bluish black clay appears analogous to the regur, which will be described below. This accumulation of clays and sands it is probable extends with little intermission along the coast to the mouth of the Ganges, where they will be interrupted probably by the fluviatile deposits of this mighty river. The delta of the Ganges, as far as we can gather from one boring experiment, consists at Calcutta of a series of dark clays and sands; they rest at the depth of 350 to 485 feet on a gravel composed of rolled pebbles of granitic crystalline rocks, similar to those described by Captain Cautley at the base of the Himalayas. The uppermost strata contained portions of peat, kunker, and fragments of trees, and the lowest beds, beneath a layer of dark carbonaceous clay under which were fragments of coal, fossilized portions of turtles, and the caudal vertebra supposed to be that of a Saurian. In the arenaceous beds above this, more than 200 feet from the surface, were found the lower half of a humerus, which Mr. Prinsep supposed to be like that of a dog, and a fragment of the carapace of a turtle. From the granite and gneiss gravel it has been inferred by Dr. M'Clelland, that bold mountains of these rocks existed in close proximity to the present site of Calcutta. The superimposed carbonaceous beds indicate a marshy surface clothed with vegetation, prior to which the currents which brought down the gravel, he thinks were arrested by the contemporaneous subsidence of the mountains and the lowering of the bed of the Ganges.

The Regur deposit. In a paper read before the Royal Society, several years ago, I have already endeavoured to show that the remarkable loam called Regur, is not a fluviatile deposit, as supposed by



The principal objections to these theories of Voysey and Christie are, lst. The great extent and geognostic position of the regur, cover-

ing both the tabular summits of hills, the bottoms of vallies, vast almost treeless plains, with a sea-like horizontality of surface, often far removed from the least influence of existing rivers and low floods. Its occurring in broad detached patches often far above the long, narrow lines of drainage.

2nd. Its underlying occasionally all present alluvial soils, those of the trap included, and filling up chinks and fissures in the subjacent rocks.

3rd. Its overlying granitic, hypogene, sandstone, limestone, and lateritic rocks indiscriminately, far distant from trap rocks which it also overlies.

4th. All trap rocks in weathering, redden by peroxidation of the protoxide of iron they contain; and usually form first a brown, then a reddish-brown, or coffee-coloured soil.

5th. The regur, at a distance from trap rocks, imbeds no fragments of them, even of their hardest and most lasting vein stuff, such as quartz, jasper, heliotrope, agate, and calcedony. It often imbeds fragments of whatever rocks it may happen to overlie, or which are washed into it.

6th. The remarkable homogeneous character and colour of the regur over large areas, when free from recent foreign admixture, to which it is subject, as well as to retarrangement from present rains and inundations.

7th. The different colour, generally shades of brown and red, of the present fluviatile deposits of Southern India, and their varying character over small spaces even.

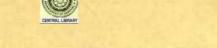
In common with some clays of the boulder deposit, the stratification of the regur is rarely apparent, and always obscure. But this phenomenon I have observed in the mud of tanks over which the water has been deepest and stillest, and where the particles deposited were of a very fine and homogeneous character. In proportion as the nature of the mud deviated from these conditions, and became intermixed with silt and sand, the layers of deposition became more and more distinguishable.



This I also remarked to be the case with the mud of the Nile, particularly in the upper parts of its course through Egypt: but on the Delta where the slope of the bed is still less, and the motion of the stream languid, the stratification is more obscure.

Both in the mud of the Nile, and in that of the tanks of India where annual layers of deposition may be strongly marked, the layers of monthly, weekly or daily deposition are indistinct or not to be traced; hence the interior of the annual layer individually has an unstratified appearance. The same is observable in the structure of some individual beds of enormous thickness, as in the thick-bedded sandstones, in which, if the particles are of a homogeneous nature, stratification is hardly visible even on the face of cliffs 200 or 300 feet high.

It is possible that the regur, which is often thirty feet thick, from its generally unstratified aspect and homogeneous charactercontaining no interstratified layers of sand or pebbles, was the result of one period of deposition. In areas where stratification is said to be more distinct, for instance in Baroche, the deposit has probably undergone re-arrangement by subsequent currents. It is just such a deposit as might be expected to result from deep waters charged with the debris both mineral and vegetable of a submerged continent, the coarser and heavier fragments of which, as well as the silts and sand, had been deposited or left behind by the slowly retarding current. At length, as the waters gradually gained their level, the turbid fluid, now charged with nothing but the very finest and lightest particles, would move so slowly as to admit of their gradually sinking and being deposited on its bed. Above the first cataract and in Upper Egypt, where the current is more rapid, the deposit is usually of a coarse, and more silty nature than in Lower Egypt and on the Delta, and not of so carbonaceous a nature. Many of the finest particles are never deposited at all by the Nile in Egypt, but are carried out with its waters, and discolour the Mediterranean upwards of 70 miles from its embouchure. The sea water from its great specific gravity adds to the obstacles against deposition. The deposit of the Nile in some parts, as well as those of some tanks in India, not only resembles the regur in external appearance and colour, but also in chemical character. All three contain a considerable portion of vegetable matter.



In colour, extent, and position, the regur resembles the Tchornoi Zem covering the plains of Russia; and in apparent want of stratification that fine yellowish-grey loam called Loess, which covers great part of the basin of the Rhine in beds sometimes 300 feet thick. The regur, however, contains no fossils except such present freshwater and terrestrial shells as are washed into it. If we suppose the regur to be the deposit of annual inundations from ancient glaciers (which Mr. Lyell takes to be the origin of the Loess) charged with the impalpable mud of their moraines, we must examine the Ghauts and Vindhyas, or even the Himalayas below the influence of present glaciers, for the usual signs of glacial action. The soil now washed down from these mountains, I need hardly observe is reddish and sandy, very different from the deep black or bluish black regur: but this difficulty may be perhaps got over by supposing the vast forests which clothed them during the warm ante-glacial period to have perished with the mammoths they shaded, and to have been ground down by glacial action with the felspathic, silicious, calcareous, and ferruginous particles of the subjacent rocks.

If we suppose it to be a deposit from former great inland lakes, in most cases we shall have to raise up rock barriers, not now in existence, to separate them from the sea and the adjacent lower lands, to sink them again; and, in fact, to change the entire physical configuration of the country. If it be considered a deposit thrown down on a sea bottom from melted icebergs, we ought to see in it large angular fragments of distant rocks, which no observations as yet show to be the case.

The non-fossiliferous character of the regur is common to the mud of the Nile, and may be regarded as indicative of the great trituration the debris composing it has undergone; and probably that chemical and other causes have combined to prevent fossilization in this soft mud.

Rock-basins. Rock-basins, the giant's caldrons of the Swedes, are seen occasionally on the summits of table-lands in Southern India, as for instance near the Kurnool frontier, with Baugapilly, and in other localities both in granitic and hypogenic rocks, and in the diamond sandstone and limestone in situations above the present action of running water; but when we see them in the fact of being excavated by water alone in the rocky beds of the principal rivers of India during these periodical rises and falls—conditions favourable to their production—



there appears no necessity for introducing the action of glaciers to account for their presence, which I have explained in detail elsewhere.

Furrows and parallel Strice. On and near the tops of the diamond limestone ranges of Pycut Puspulah, and Yairypilly—not far from the granite junction near Gooty, I have seen the surface of the rock traversed by furrows, having a common direction of N. by E., resembling those attributed to the action of glaciers; but in Europe even, where these marks are so numerous, the opinions regarding their origin have been latterly so conflicting, that their unsupported testimony may be regarded as much in favour of the diluvialist or of the advocate of the waves of translation, as of the glacialist and icebergian.

I have since had opportunities of carefully examining the grooves which cover the surfaces of the diamond limestone rocks near the caves of Billa Soorgum, Kurnool frontier, and on the summits of the hills between Dhone and Yeldroog in the Bellary district.

The limestone slabs in these localities dip slightly towards the east, and are in some places completely scored with furrows, which observe a parallelism over confined spaces. These furrows vary from the size of a goose quill in diameter to two inches, and are often separated by scabrous sharp edged ridges. They are often traversed by others at oblique and right angles so close together that the dividing ridges are cut up into a number of pointed cones, or pyramids.

It is quite evident from the sharpness of the edges and points of the ridges, that the grooves were not formed by the passage of gravel moved under the enormous weight of a glacier. The interior of the furrows has frequently to the eye a smooth apparently water-worn surface; but if the point of the finger be moved gently along the bottom, it will often be found to undulate. These undulations have been caused evidently by the wearing down of the lips which formerly separated the now continuous trough into a chain of oval or spheroidal cavities exactly resembling in miniature the chains of rock basins worn in the granite and gneiss of the Toombuddra.

Like them the majority of these furrows are attributable to watery erosion. They occur usually on the lines of almost imperceptible fissures in the rock-like vallies of erosion thus. (See Plate, No. III.)

<sup>\*</sup> Vide Proceedings of Geological Society, 1841-2.



They not only traverse the upper horizontal surface of the strata, but sometimes continue over the edges down their vertical extremity or sides, which is attributable to the action of water slowly trickling over the edge, and not propelled beyond the edge to a distance from the vertical side, as is the case in a cascade.

The water, in many instances, seems to have acted corrosively as well as erosively on the substance of the limestone; for in examining some rain water, which had lodged in one of the eroded cavities, I found it held a considerable quantity of lime in solution. Carbonic acid might have been supplied from atmospheric exposure or from the surrounding dense vegetation, which the rains refresh. The solvent power of water too in tropical climates is considerably enhanced, not only by the increased temperature of the water itself, but by expansive action of the sun's rays on the atoms composing the rock-bare surfaces, some of which I have found often heated to 130°. The solid layers of schist are free from such furrows, but have a scabrous waterworn appearance, as if the limestone had been washed away.

Any pre-existing cavity in the surface of the rock forming a lodgement for the water, assists in the erosion of hollows. Strings of iron pyrites frequently drop out in weathering, leaving a chain of oval cavities, which the water soon works down into a continuous furrow. Others commence in the perforations of lithodomous molluscs, or those of existing snails which apparently by the chemical action of their juices take up the lime necessary for their house and food, and are found in numbers adhering to the surfaces and sides of the limestone.

It is evident, however, that some of the furrows were scooped out prior to the last displacements of the rock strata, as they partake of the faults and dislocations; and it is probable they were formed during the elevation of the land by sea water, as it is well known that sea water by the decomposition of its muriates and sulphates produces furrows and wrinkles on the surface of limestone, particularly near the water's edges, and subsequent rains have no doubt acted in extending and modifying them. The entire absence or great comparative rarity of such furrows on the surface of the associated sandstone, may be regarded as a further indication of the chemical action of the water in producing the furrows on the limestone.



In some places on the sides of the hills, the ends of the limestone beds protrude in steps about a foot high, down which the rain water has evidently flowed in a series of miniature cascades, which have hollowed out on the slabs below little cavities, and depressions not unlike the lapiaz of the Alps, marked by a a in the subjoined sectional diagram. (Plate, Diagram, No. IV.)

Variolated surfaces. The surface of some slabs exposed to the air I observed to be perfectly variolated with circular, shallow cavities, caused by the dropping out of cubic crystals of iron pyrites. These crystals may be seen in every stage of decomposition,—first tarnishing, and losing their bright metallic lustre; next passing into a bronze-coloured hue: they then become liver-coloured, and lastly pass into a loose rust-coloured dust. At this stage, the limestone becomes stained by the rust nearly in semi-circles, marked a a a a, on each side of the crystal marked b, in the Diagram b, representing the decomposing crystal of pyrites. (Plate, Diagram, No. V.)

In the next stage, the angles between a a a a, become discoloured, and the whole stain takes a circular form; then the centre occupied by the crystal drops out, and finally the whole circular space, occupied by the rust-coloured stain.

Mark of ancient rains. Surfaces of rock variolated with such cavities must not be set down as having been indented by an "ante-diluvian shower," though marks exactly similar to those supposed to be the effects of ancient rains exist on slabs below the surface covered by other layers, the lower planes of which exhibit the casts of these impressions.

Ripple marks. Ripple marks are seen in similar situations to the rain-drop impressions, but are much more frequent in the associated sandstone.

Striæ and Furrows on granite and gneiss. Striæ and furrows on granite, gneiss, &c. in situations beyond the reach of present aqueous causes are rare, and, from their conforming to the hard and softer parts of the rock, cannot be set down as marks of glacial action. These rocks, as before observed, are much subject to exfoliation by atmospheric exposure; consequently ancient marks, if they did exist, are liable to early obliteration on the air-exposed surfaces of such rocks.



Concluding observations. In reviewing all these deposits I can trace nothing analogous to the true boulder deposit, or to the action of glaciers, in the marks and furrows of the rocks just described. There is nothing which cannot be explained by existing causes, or by the supposition of the action of water during the oscillations which, there can be no doubt, the face of India has undergone.

The power of the wave of translation is written in large characters of denudation over its entire surface; or they stand out in bold relief in the bare dykes and naked clustered masses of basaltic greenstone and granite, and also in the harder beds and veins, which we see every where abruptly projecting, like the trap of the Wrekin in Shropshire, from the softer abraded strata around. It is visible in some of the larger gravels, and in the isolated horizontal beds of sand-stone and laterite capping hills separated by denuded vallies and plains.

To the gentler effects of the waters retiring as the land gradually emerged from beneath, aided by minor oscillations, may be attributed the former wider channels of the rivers—the river terraces, the inland marine clays and sands on the coast of Coromandel, indicating former estuaries, and coast lines and inlets, now dry land; beds of gravel and loam in the interior; furrows and rock basins beyond the reach of existing aqueous causes, and ancient marl-bottomed lakes now desiccated, the existence of which is now only indicated by fossil lacustrine deposits, for instance, those of Nirmul.

The agency of floating ice in conveying the granite blocks we see imbedded in the mud and gravel of the east coast of England, from the mountains of Scandinavia across the intervening seas, is now pretty generally admitted.

One remarkable feature of the boulder formation still remains to be noticed, viz., its extreme rarity in warm latitudes, and its great prevalence in the cold and temperate regions of both hemispheres. In the northern hemisphere we behold it stretching from the icy regions of Scandinavia to about 55°, and overspreading part of North America; and in the Southern world it has been traced, with precisely the same features as in Europe, in Chili and Patagonia, between 41° South and Cape Horn.



This fact is considered by Mr. Lyell to be in favour of the iceberg theory, since the masses of drifting ice in approaching warmer latitudes would melt from the warmth of the sea and the action of the sun's rays on their sides and surface, and discharge their rocky freight long before reaching the equator.

The absence of the boulder formation in Southern India would add weight to this supposition; but until it has been more thoroughly searched for, we must not jump to this conclusion. Its comparative rarity, however, from the evidence even at present before us, cannot be doubted. I have sought for this formation, and also the old Silurian beds in countries yet nearer the equator, in the Malay peninsula, but in vain:—also on the southern and eastern coasts of the Mediterranean, the Red Sea, Egypt, the southern parts of Asia Minor, and the Peninsula of Sinai; but with similar success.

To support both the glacial and iceberg theories a period of intense cold in regions where a temperate climate now prevails, is supposed, as before stated, to have existed at a period between the extinction of mammoths and the creation of man. This cold, it is natural to imagine, would influence more or less the climate of countries nearer the equator, and among the rest that of Southern India; but as yet proofs of this decrease of temperature in the latter, either by the existence of the fossil fauna of more temperate or colder zones, the marks of ancient glaciers, or by other physical facts, are a desideratum.

For recent marks of glacial action, the Himmalayas afford perhaps the best examples nearest the equator, and should be examined with care for ancient moraines, and other indications of a former greater extension of the ice and snow which now cover portions of the peaks and sides. If they be found, the next step will be to ascertain whether such extension of ice is ascribable to a former general decreased temperature of the surface as it now exists, or from a former state of greater elevation of these mountains. It has lately been argued, from the circumstance of fossil animals of warm climates having been found in tertiary Himmalayan deposits now above the line of snow, that the Himmalayas must have been elevated about 10,000 feet since the extinction of these races. It is, however, possible that dur-



existed at the heights at which they are now found, or even at greater elevations. The geologist will do well, while marking the scale of former glacial extent in these instructive regions, to note also the nearest approach, habitual or casual, to the snow line of the subtropical animals at its base. The monkey and tiger have been observed close to it, and the elephant at no very great distance—31° N. lat. 4000 feet above the sea. Tropical perennials are blended with a flora almost alpine, and the palm and the pine are seen in juxta-position.

The sub-Himmalayan gravel beds entombing the remains of the sivatherium, mastodon, elephant, rhinoceros, hippopotamus, &c., and the mastodon beds in the valley of the Nerbudda, are all stratified, and belong apparently to the tertiary period immediately antecedent to the supposed cold epoch of the boulder formation. (Vide concluding page at the end of Desiderata.)

India, stretching down from its vast icy barrier on the north to the verge of the equator, presents a wide field for physical observation; a thousand-times-told fact, but one which should never be lost sight of. Its surface has been but partially examined, and many large tracts wholly unexplored by the geologist. A few years only have rolled on since the great mammifers in its deposits, just alluded to, were brought to light by the vigorous researches of Captains Cautley, Durand, Baker, and Doctors Falconer and Spilsbury; and still more recently it has been proved by the splendid fossil discoveries of Messrs. Kaye and Cunliffe in the limestone beds of Pondicherry and Verdachellum, that the cretaceous sea extended over the surface of at least part of Southern India. Major Franklin has referred the diamond sandstone and limestone to the Oolite and Lias, though at present they cannot be satisfactorily classed with these rocks until further fossil evidence be obtained.

The scantiness of these beds—the utter absence of the new red sandstone, magnesian limestone, and other aqueous deposits so abundant in northern zones, has been long subject of enquiry. The Silurian strata are also entirely wanting, and appear to thin out like the boulder formation as the equator is approached; although the temperature of the Palæozoic seas, if we may judge from the number of their corals, must have been like that of the carboniferous period, warm. I am

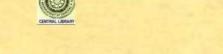


not aware, that the Silurian strata extend in Europe further south than the vicinity of Constantinople.

Are we to infer that these enormously thick aqueous deposits, abounding in the remains of marine creatures of strange and unknown aspect, since the appearance of which whole generations of others equally strange have replaced them and been obliterated in turn from the face of creation, have existed on the granites and trap of India, but have since been swept off by waves of denudation: or must we suppose, that these old fossiliferous rocks never had existence in Southern India and tropical countries, from the peculiar chemical conditions, or temperature of the seas which then covered them? Or, that the surface of these tropical regions was above the water at the time these deposits were going on in the then warm coral-producing seas around the arctic zone?

It may be also advanced, that the hypogene or crystalline rocks, which prevail so much in Southern India, are nothing less than the metamorphic fossiliferous strata of these periods. It must, however, be objected against this theory, that no fossil has ever been found in them, even at great distance from granite or apparent Plutonic action.

It has already been inferred, from the rarity or absence of the boulder formation in Southern India and other tropical and subtropical countries, that these regions enjoyed a warm climate during the frozen period which M. Agassiz assigns to now temperate climes during the boulder epoch. As there is no evidence of the climate of the former regions during the Silurian period, or of the then chemical condition of thier seas, it will be advisable, until better information be elicited, to refer the absence and the rarity of the older fossiliferous groups of Europe to the hypothesis of partial or entire elevation during such periods. Of denudation there is ample proof in subsequent periods, as before stated. We search in vain (the chalky spots near Pondicherry, Verdachellum, and a few other marine patches-isolated, yet significant monuments-excepted,) for remnants of these former fossiliferous coverings. I have not been able to trace a pebble from their detritus in any of the conglomerates, breccias, or gravel beds which now exist on its surface. If such beds ever did occupy the surface, their wreck for the most part must now lie in the bed of the ocean.



If Southern India was above the ocean during the deposition of the Silurian rocks, and other fossiliferous strata, of which no remains now exist on its surface, it must have subsequently undergone oscillations by which portions, or the entire mass, including the tract occupied by its grand physical feature, the Western Ghauts, were submerged, and again elevated to their present position with the laterite which, there is every reason to believe, belongs to the tertiary epoch. That at least a portion of Southern India must have been a sea-bed during the cretaceous period, has already been shown.

Some of the points latterly touched upon in this paper involve, it will be perceived, the highest and most interesting problems in physical geology, which cannot be solved until much more evidence be accumulated regarding the geology and former physical phases of tropical and sub-tropical zones. It has been ascertained beyond doubt, that the seas of ancient periods formerly covered a far greater extent of what is now land in the northern hemisphere, and the contemporaneous and much greater relative prevalence of land within or near the tropics is supposed, in order to account for the higher temperature which, it is evident, then prevailed in northern regions; but the present decrease of which is accounted for by Sir John Herschel on astronomical grounds, viz., that the mean amount of solar radiation is dependent on the eccentricity of the earth's orbit, that this eccentricity is, as has been for ages, actually on the decrease; and with it the annual average of solar heat radiated to the earth's surface.

Desiderata on the Boulder formation. In the hope of eliciting information touching the occurrence of the boulder formation in India, (and how much might be obtained even from persons entirely ignorant of geology now crossing India in every direction,) I have drawn up a few plain directions by which the true boulder formation may be readily distinguished from the ordinary gravels and alluvia of the country; and have added a list of the principal points on which information is required.

Sir John Herschel has well observed, "What benefits has not geology reaped from the activity of industrious individuals who, setting aside all theoretical views, have been content to exercise the use-



ful and entertaining occupation of collecting specimens from the countries they visit." This observation applies particularly to India—the geology of which is so little known—where, it is true, there are no professed geologists attached to our surveys; but where every individual has the means and ability of adding his mite to the general stock of knowledge, without any serious encroachment on his duties or his pleasures. "Even those who run may read" in the great open book of Nature; and if they read, there is no reason why they should not note, for the benefit of those who have not the opportunity of studying, the same pages."

Boulders and erratic Blocks. The term "boulder" has been often misapplied to any loose rounded block of rock lying on a plain, or elsewhere on rocks, or the soil of rocks, of which it originally formed part. This is not a "boulder" in the geological acceptation of the term, the block being in sitü; or not distant from the rocks of which it once formed part. A true boulder is a mass of rock, the corners of which have been rounded, from the size of a man's head to that of a field-officer's tent or a small bungalow, found detached and at a distance from the parent rock of which it once formed part, and resting on rocks generally of a different nature, or imbedded in gravel, clay, or loam.

Erratic blocks are fragments of rock, with sharp or little blunted corners, found in similar situations as boulders, or what is termed not "in sitü," or transported from their native beds. Among the most remarkable erratic blocks in the world are the angular blocks of granite and gneiss, some as large as a Swiss cottage, which rest on the limestone rocks of the Jura. Now the nearest granite and gneiss rocks are those of the Alps, from which it is certain those blocks have been derived, although the great and deep valley of Switzerland, upwards of 50 miles broad, separates the two ranges.

<sup>\*</sup> While Captain Newbold was writing this forcible passage at Kurnool, Lieutenant Sherwill was forwarding to the Society from Behar the splendid map and collection of specimens which we noted in our Proceedings of January 1845, and which the Society has most properly brought to the special notice of Government. It is impossible to give a better illustration of the truth of these remarks.—Eos.



A block of mica schist, weighing upwards of eight tons, lies on the top of the Pentland hills, 1000 feet above the sea, 50 miles from the nearest mountains of mica schist.

When loose, round, or angular masses of rock are seen on the surface, or imbedded in loam, clay or gravel, the nature of the rock and that of the subjacent and adjacent rocks should be compared. If they are similar, it will be difficult to prove the masses true boulders. If different, the bearing and distance of the nearest similar rocks should be ascertained, and the nature of the intervening ground described whether intersected by valley, hill or stream, &c. In all cases, specimens about two inches square or more of the blocks, the adjacent and subjacent rocks, and of those from which they are supposed to have been derived, should be broken off, and wrapped up in strong paper and carefully marked.

If it be certain that they are boulders, or erratic blocks, and not "in sita," their size and shape and number should be described, drawings made, the arrangement and longitudinal direction of the blocks, their bearings by compass, the height above the sea if possible, a description of the physical features of the locality and surrounding country. When circles of blocks are found round the tops of hills or other projecting points of the surface, care should be taken not to confound the old cairn-like mounds, circular burial places, old sheepfolds, remains of forts, or other old enclosures scattered over India, for the circles called "perched blocks."

The old inhabitants and watchmen (Taliaries) of the nearest village, should be carefully questioned on such points.

When erratic blocks can be traced to the parent rocks, it should be carefully noted whether they gradually increase in size as the rocks whence they were transported are approached.

Gravels, Clays, and Sands of the Boulder formation. The boulder formations of England, (called "Till" in Scotland,) of the north of Europe and America, and also that in the opposite hemisphere, are—1st, characterized, principally, by their generally unstratified character; 2nd, by imbedding both large and small, angular and rounded fragments of rocks of all ages in juxta-position, confusedly jumbled together without reference to the laws of gravitation



or aqueous deposition, which are often reversed in the boulder gravels and the heaviest fragments found uppermost; 3rdly, the great rarity of fossils. A few marine shells of an arctic character and the remains of a mammoth have been found in the till of Ayrshire; arctic marine shells in that of North America; and I have observed marine shells of recent species in that of Cheshire.

The boulder formation, in short, consists of usually unstratified accumulations of clay, loam, silt, sand or gravel, often 100 feet thick, imbedding sometimes great fragments of rock several yards in diameter, torn in many instances from rocks, hundreds of miles distant, separated by vallies, rivers, and even seas, as is the case in the drift on the east coast of England, which imbeds granite blocks from the mountains of Scandinavia. These deposits are sometimes capped by stratified layers of sand and gravel, and occasionally contain marks of stratification themselves.

The observer having, by these marks, ascertained that he has a boulder deposit before him, should note its general shape, direction and dimensions. If it occurs in detached truncated mounds, or tumuli like the terminal moraine of a glacier? or like lateral moraines, in longitudinal ridges with a double talus? the continuity and parallelism at the same height which is supposed to distinguish the lateral moraine of a glacier, from the debris disposed along the bottoms of the vallies by currents? The thickness and extent of the gravel, sand, clay or loam composing the deposit, should also be noted; the nature of the beds it rests upon, and also of those above it; of all which specimens should be sent, as well as of the curious pebbles, sands, clays, &c. of the boulder deposit. It also should be noted whether the stratified portions of the boulder clays or gravels be bent up or contorted, as if by lateral pressure; and whether the subjacent beds have been conformably or similarly disturbed.

The relative proportions of the pebbles of various sorts of rocks composing the gravel, their relative size, degree of attrition or roundness, should be ascertained; and the different sites whence originally washed, searched for in the vicinity.

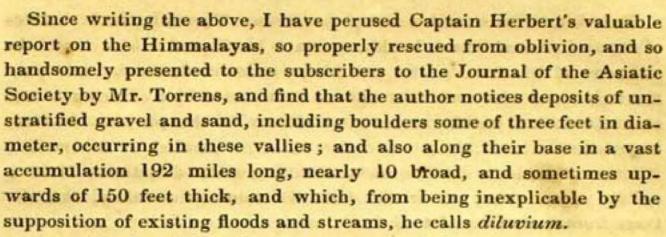
The gravel, clays, mud and loam should be examined for fossils; and the condition of the latter, whether broken, water-worn or entire, and in good preservation, noted.

Furrows, striated and polished surfaces. The sides and surfaces of exposed planes, bosses, boulders, erratic blocks and masses of rock in sitû, should be examined for polishings, striæ, or furrows, more particularly the surfaces of rocks which are protected by a covering of soil or turf, which it will be necessary to remove for this purpose. It must be noted whether the striæ and furrows are parallel or otherwise; whether oblique or horizontal, and their general direction. If in a valley, whether they run in the same direction as the valley, and diverge from it at the outlet.

Whether they run in right lines, with even, uniform polished suraces, or are shallower or deeper, varying according to the different degrees of hardness or softness of the different portions, and veins of the rock, and whether their course is at all sinuous. "Slickensides" or the polished and striated surfaces of walls of fissured rocks and vaults caused by their friction in dislocation, must not be confounded with the marks of general or aqueous action.

The observer should endeavour on the spot to ascertain the possibility, or impossibility, by the supposition of present floods, rains, landslips, or other causes now in existence, of explaining these depositions, furrows, &c.; and also of the circular, oval, and spoon-shaped cavities, with smooth sides in rocks, termed rock-basins, which are often united by shallow gutters. It should be ascertained whether they are or are not within the reach of the highest inundations, or temporary petty cascades caused by monsoon rains, the periodical risings and fallings of rivers; whether empty or containing sand, or pebble; the nature of the pebbles, the dimensions and shape of the cavities, and nature of the surrounding ground.

Engineers, surveyors, and other servants of Government stationed in districts, will have time to note on all these desiderata as affecting their particular district; but it will be sufficient for men who travel rapidly from station to station, or on the line of march, to bear in mind that the great points to ascertain are—whether the blocks and gravel they see are composed of the adjacent and subjacent rocks or not, their distance from their native beds; to send specimens of all: and to see that the blocks and marks on the rocks are above the influence of present water-courses, inundations, and rains.



From his description, it seems to me probable, that some of these deposits and their attendant phenomena have been caused by the action of glaciers and debacles, the result of their melting.

The whole of them, and the *Tals* or lakes upon them, are well worth separate and extended investigation; and diligent search should be made on the rocks of the sides, surfaces, and outlets of the vallies, for the other supposed marks of glacial action just enumerated, and of which Captain Herbert has given us no information.

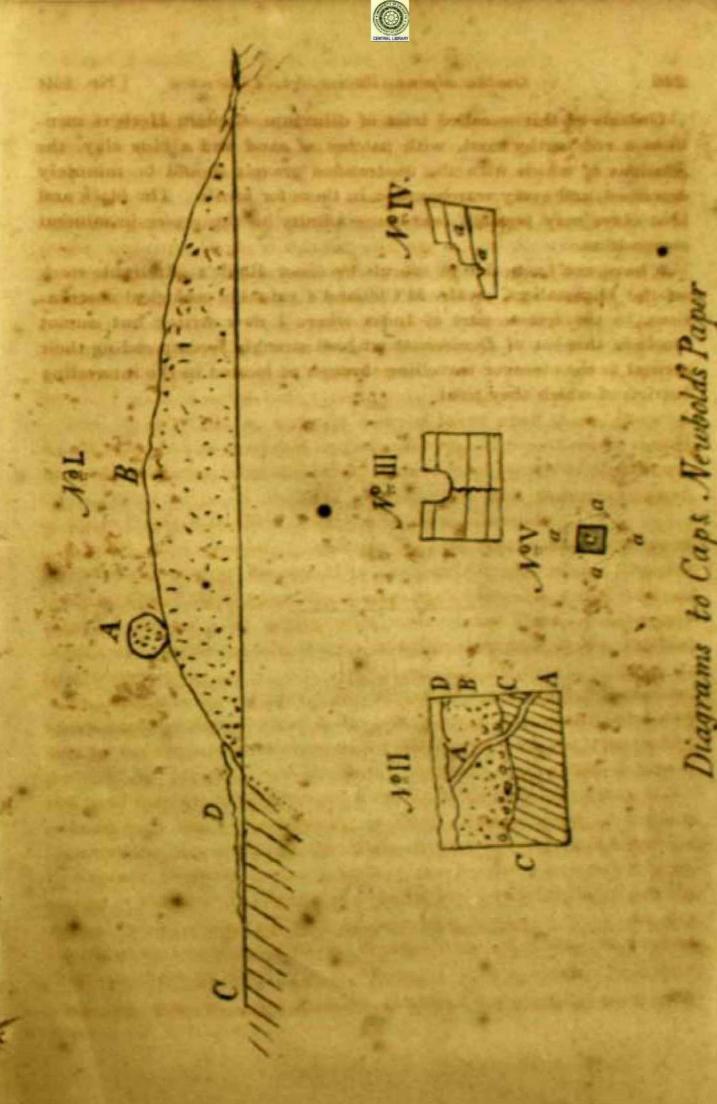
Among other promising localities may be enumerated the great transverse *Doons*, or vomitories of drainage, through which flow the Ganges, Sutlej and Jumna, the Ramgunga and the Gaggur, from their bases of glaciers; the mouths and sides of the glens opening into them; the vallies of the Burral and Dhaolee, and of the Pubbur near Massooleea.

The immense bed of gravel and masses of rock called the Bhabur, which stretches along the base of the mountains, succeeded at its southern base by the remarkable terrace called the Terrai, both cut transversely through by present river channels; and the level-surfaced gravel and sand deposits locally termed Khadirs, through which many of the streams run, may be particularly pointed out as subjects for detailed information. Some of the mountain-streams are engulfed, according to Captain Herbert, in the gravels of the Bhabur; but probably reappear in the line of springs visible at its junction with the step of the Terrai which, from its striking moistness compared with the dry absorbent surface of the Bhabur, is probably a bed of some impervious substance, such as clay.\*

<sup>\*</sup> See Mr. Batten's valuable observations on the Terrai of Rohilcund and Kemaon, Journal, Vol. XIII, p. 887.

Outside of this so-called tract of diluvium, Captain Herbert mentions a red earthy marl, with patches of sand and a blue clay, the relations of which with the unstratified gravels should be minutely described, and every search made in them for fossils. The black and blue clays may possibly bear some affinity to the regur in mineral composition.

I have not been able to consult Professor Royle's admirable work on the Himmalaya, or Dr. M'Clelland's valuable geological observations, in the remote part of India where I now write; but cannot conclude this list of *Desiderata* without strongly recommending their perusal to the observer travelling through or located in the interesting districts of which they treat.



### Proceedings of the Asiatic Society of Bengal, MARCH, 1845.

The monthly meeting was held at the Society's Room, on Tuesday, the 18th March, at ½ past 8 p. m.

Charles Huffnagle, Esq. in the chair.

The following list of books presented and purchased was read:-

Books received for the Meeting of the Asiatic Society, Tuesday, March 18th, 1845.

BOOKS PRESENTED.

- 1. Meteorological Register kept at the Surveyor General's Office, Calcutta, for the months of December, 1844, and January, 1845.
- Jahrbücher Der Literatur, of 1843, vols. 4.—By the Baron Von Hammer Purgstall.
- 3. Geschichte Der Ilchane, by the Baron Von Hammer Purgstall, vol. 2.—By the Author.
  - 4. The Sugar Planter's Companion, by L. Wray, Esq. Part II.-By the Author.
- Proceedings of the Academy of Natural Sciences of Philadelphia, vols. 2, Nos. 2 and 3.—By the Academy.
- 6. The Oriental Christian Spectator, for the months of January and February, 1845, Nos. 1 and 2.—By the Editor.
- 7. The Calcutta Christian Observer, for the months of February and March, 1845,—By the Editors.
- 8. Journal of the Agricultural and Horticultural Society of India, Part IV.—By the Society.
- 9. The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, No. 165, September, 1844.—By the Editor.
  - 10. Proceedings of the Geological Society of London, vol. 4, No. 98 .- By the Society,
- 11. The Journal of the Royal Geographical Society of London, vol. 14, Part I. 1844.—By the Society,
  - 12. Proceedings of the Royal Society, No. 59; 1843-44. By the Society.
- 13. Philosophical Transactions of the Royal Society of London for the year 1844, Part II.—By the Society.
- 14. Récherches Sur les Poissons Fossiles, par Lt. Agassiz, Quatorzième, Quinzième et Sizième livraisons réunies, 1842 and 1843.—By the Editor.
- 15. Ditto Ditto, Planches Quatorzième, Quinzième, et Seiziemes livraisons réunies. 1841 and 1843.—By the Author.
- 16. Specimens of the illustrations of the Rock-cut Temples of India,-By J. Ferguson, through W. Ferguson, Esq.
  - 17. Five Maps of different parts of Asia, Berlin, Beimer. By the Rev J. Hæberlin.

### BOOKS EXCHANGED.

- 18. Calcutta Journal of Natural History, January, 1845, No. 2.—By John M'Clelland.
- 19. The Annals and Magazine of Natural History, including Zoology, Botany and Geology, Nos. 92, 93, 94 and 95 of November, 1844, to January, 1845, vols. 14 and 15.
  - 20. Journal Asiatique. Quatrième Serie. Nos. 14 et 15, Mai et Juin 1844. Tome III.
  - 21. Journal des Savants, Juillet, 1844.
- 22. The Athenseum for November 9 and 16,—December 7, 14, 21 and 28, 1844, and January, 1845,-4-11, and 18.

#### BOOKS PURCHASED.

- 23. History of the Indian Archipelago. By J. Crawfurd.
- 24. Strange's Elements of Hindu Law, vol. 2.
- 25. The Classical Museum, No. VI., January, 1845.

Mr. C. Joseph presented a copy of his map of the river Hooghly, from Garden Reach to Bandel.

Read the following letter from Messrs. Allen and Co., the Society's London Agents.

HENRY TORRENS, Esq. Secretary to the Asiatic Society of Bengal.

Sin,—We beg to state you, for the information of the Society, that we have every reason to expect the completion of the bust of Mr. Hodgson in the course of six weeks or two months from the present date.

We have, as requested in your letter of the 30th May last, applied to the Proprietors of the Athenaum and Spectator respecting the non-receipt of their publications by the Society since December, 1840. We have not been favoured with a reply from either party, and conclude it is not their desire to make an exchange of publications with your Society. It is not quite usual for the Proprietors of Newspapers to furnish gratuitously their publications. They expect to receive and very seldom make any return.

The Journal of the Royal Institution has not been published for years. In our next parcel to the Society, we shall include the Asiatic Journal from January, 1841, to the present time, and it shall be continued as published in future. Your favor of the 5th October last, acknowledging the receipt of our account sales, and giving us instructions as to the disposal of the balance, shall have our best attention.

We have the honour to be, Sir, your faithful Servants,

London, January 12th, 1845.

W. H. ALLEN AND CO.

Read correspondence, with notes by the Secretary and Committee of Papers, from Mr. J. Hendrie, soliciting employment as draftsman to the Society, and claiming payment of a bill to the amount of Co.'s Rs. 250, which had been submitted by him for work done on trial.

Resolved that the recommendation of the Committee of Papers, that Mr. Hendrie be paid the sum of Co.'s Rs. 150 for the works ubmitted, be adopted, and that the Committee of Papers be requested to report further as to the expediency of the employment of Mr. Hendrie.

Read the following note by the Secretary :-

At the December meeting Dr. Hæberlin announced through the Secretary his intention of publishing a Sanscrit Anthology consisting of fifty brief but choice specimens of the best School, that of Kali Dasa, of Sanscrit poetry, didatic, elegiac and others. This offers to the Sanscrit Scholar a description of work as yet a desideratum in the learned world, a book namely, which may enable him to study in brief, and at small cost, the best and choicest classical style of eminent writers in that ancient and admirable language. Dr. Hæberlin proposes to publish the work himself, but in communication with him the Secretary suggested to the Society their taking a certain number of copies of it. It will prove a most valuable book to the Society, for the purpose of distribution to learned bodies, and individual scholars in correspondence with it. The copies will be delivered at trade price. He stated that he was not prepared to note at present the number of copies to be taken, but after making a list of quarters in which they might be distributed, and a reasonable stock of reserve copies, the Secretary said he would have the honor of laying that list definitely numeralised, before the Society if the general proposition be favourably received.

The Secretary stated that it had been deemed advisable that the Society should subscribe for 100 copies of this interesting work, which was agreed to.

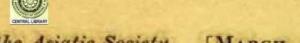
The Secretary presented on the part of S. G. T. Heatly, Esq. an abstract of the proceedings of the former Statistical Committee of the Society, (December, 1836, to March, 1839,) and it was resolved—

That the records which are not at present forthcoming be searched for, that the abstract be circulated to the Committee of Papers, that the Committee of Papers resume the Statistical Committee's deferred privileges, and that it be recommended to them to re-agitate the right of free postage, &c. &c.

The Secretary stated that he had received from Captain Cunningham and Mr. Tregear a collection of coins which they offered for sale, and of which the package, yet unopened, was upon the table, but that he desired, previous to submitting the proposal to the Society, to communicate with Captain Cunningham.

The following coins were presented by the Sub-Secretary on the part of Captain Marriot, B. N. I.—2 coins of Mahmed Shah, Ben Nassir Shah, A. H. 627-634. 1 coin of Mahmed Toghluk, A. H. 725-752, both were in the Society's cabinet, and 2 Bactrian coins of Kadphises, and on the part of Lieutenant Sherwill, B. N. I., of the Behar Revenue Survey, two bags containing 134 old pice of various coinages.

Read the following letter in reply to the Society's application for Lieutenant Yule's report on the Cherra Poonjee coal, as noted in the Proceedings for October last:—



To H. Tornens, Esq. Vice President and Secretary, Asiatic Society.

SIR,-Under Orders from Government, communicated in Secretary Lieutenant Colonel Stuart's letter No. 120, dated the 6th December last, I am directed by the Military Board to forward copy of Lieutenant Yule's report on the coal formations of Cherra Poonjee with Sections, &c.

J. GREEN.

Secretary.

Fort William, Military Board Office, 4th March, 1845.

The Sub-Secretary stated that in relation to this valuable paper he would read the following extract from a letter of Lieutenant Yule's to his address of 22nd October last.

My DEAR SIR,-The Sections and Report with the Military Board will be found quite useless for publication; they were the work of a young officer without any experience, just arrived in the country, and are almost confined to the account of different modes of conveying the coal to the plains. There is one point in them, which, however, should have met with attention, the coal which is found abundantly thrown up by the Panateet river near Landour. From want of time, the lateness of the season, and being unable to procure jungle cutters I was unable to trace it to its bed, and was ordered off before I could return, but the coal is apparently first rate, and probably abundant. The river is the same that I have described in the last paragraph of the notes last sent.

Kurnaul, October 22d, 1844.

The paper and plans, which last were much admired, were handed to the Editors of the Journal :-

Read the following letter to the Society :-

Monsieur Torners, Secretaire de la Societé Asiatique à Calcutta.

Monsteur,-Madame de Storr a l'intention de publier, a la fin de chaque mois une livraison de quatre costumes litographiés and coloriés, des different peuples que l'on rencontre à Calcutta ; Je desire beancoup, en regard de chaque costume, faire paraître une notice indicative des mœurs et habitudes de celui qui le porte. Mais etant depuis trop peu de tems dans le pays, je n'ai pas acquis assez de connaissances pour decrire avec verité des coutumes dont je n'ai entendu parler que vaguement.

La Societé Asiatique possède entre autres sur l'Inde, un ouvrage en 4 volumes intitulé Les Indous ou description des Mœurs et ceremonies, &c. et un autre en deux volumes ayant pour titre l' Inde Française.

Je pourrais dans les deux ouvrages trouver des rensignemens propres a completer celle que je me propose de publier ; et en vous priant, Monsieur, de vouloir bien en faire pour moi la demande au conseil, j' ose vous assurer qu'ils seront soignés comme choses extrêmement precieuses et que j'aurais a cur de justifier la confiance qu' il aura bien voulu m' accorder.

Je vous devrai aussi des remerciemens que je vous prie d'accuellir, ainsi que l'assurance de la tres haute consideration de

Votre tres humble et obeissant Serviteur,

A. B. DE STORR.

Calcutta, 21st Feb. 1845.

The Secretary stated that he had allowed M. De Storr to have from the library one volume at a time of each of the works applied for, as he deemed it incumbent on the Society to give every aid in its power to works of the kind proposed.

Read a note from E. B. Ryan, Esq. presenting to the Society a box of models of Ceylon boats, which were greatly admired for their beauty and fidelity.

The Secretary presented on the part of E. C. Ravenshaw, Esq. a memoir "On the ancient bed of the River Soane, and the scite of Palibothra" with a map. This valuable paper was handed to the Editors of the Journal for early publication.

Read the following letter from Major R. Leech, B. N. I.

To the Secretary to the Asiatic Society, Calcutta.

My DEAR SIR,—I shall be glad to hear whether the Society feel an interest in the subject of this letter.

I have taken advantage of my having been last year in charge of the Keythul and Umbalah districts to have compiled a map of the Kurukhetra, the scene of the Mahá-bhárata, as well as an accompanying account to illustrate the map from that work, from another called the Kurukhetra Mahatma, and from existing legends collected at each spot from the eldest and most intelligent inhabitants.

I should be glad to know what aid the Society is dispossed to afford me in publishing both, or the map alone, which is on a scale of two miles to the inch.

R. LEECH, 1st Ast. G. G. A. N. W. F.

Umbalah, New Frontier, 14th February, 1845.

The Secretary stated that he had written to Major Leech to say that the Society would be most happy to publish the work in question for him in its Journal or Transactions, being a subject of the highest Indian Classical interest.

Read the following extract from a letter by Lieutenant Baird Smith, to the Sub-Secretary:

I intend shortly sending you a few coins obtained from the old village or town discovered on the Muskurra River. These have been obtained without charge to the Society. The site of the town has hitherto been covered with large quantities of boulders for the use of the canal work, so I have not been able as yet to make any farther search, but as these are now, or soon will be cleared away, I hope to pick up something more.

Read a letter from G. Buist, Esq. in charge of the Bombay Observatory, intimating that he had dispatched on the ship Sterlingshire, a set of the Observatory Records for 1843, to replace those formerly sent which had been damaged by oil in the dawk bangy transit.



MUSEUM ECONOMIC GEOLOGY.

REPORT OF THE CURATOR OF THE MINERALOGICAL AND GEOLOGICAL DEPARTMENT,
FOR THE MONTH OF FEBRUARY.

Mineralogical and Geological.

We have received from Major Crommelin, B. E., residing at Darjeeling, a small collection of 24 specimens of the rocks found by him on a tour in the neighbourhood of that station; he says:—

"The specimens are not so large as might be desired; the reason is that I proceed generally alone on my excursions, and find it no small addition to the fatigue of ascending 5000 or 6000 feet, to carrying a pocket load of stones.

Darjeeling, January 21st, 1845.

From Captain Munro, Her Majesty's 39th Regt, we have received two very pretty specimens of Ribbon Jasper from the neighbourhood of Gwalior, and a specimen of Limestone with fossil remains (shells) from the Hungrung pass in the Himalaya, at 16,000 feet,

Amongst the catalogues of collections which I have sedulously collected from every corner since my connection with the Museum, I found one, at least three years ago, of a collection of specimens by Dr. Jameson from the hills; but the specimens were no where to be found. I wrote to him on the subject, as also, through Mr. Torrens to Mr. George Clark at Umballah, but the collection appeared to be lost. To our great surprise it has re-appeared as will be seen by the following letters:—

To H. Torrens, Esq. Secretary, Asiatic Society, Calcutta.

SIR,—When examining some wrecked property in my godown, the enclosed letter to your address was found, together with a quantity of stones, which I beg leave to forward to you.

Calcutta, 26th February, 1845.

J. Holmes, Secretary, Union Insurance

### H. TORRENS, Esq. Secretary, Asiatic Society.

DEAR SIR,—As Mr. Clarke was sending some boxes to you, I have taken the opportunity of transmiting a few Geological specimens, collected during my tours in the hills, and which I beg you will have the goodness to lay before the Society, as they are intended to illustrate what I have written in your journal.

Umballah, 4th October, 1844.

WM. JAMESON.

The stones also have so far escaped injury that we have the full number of specimens. But the numbers, and consequently references, to about two thirds of them have been lost, being on paper labels only.\* Dr. Jameson, however, can easily renew them from his Catalogue which is descriptive and I have written to him to request the favour of his doing so for us.

From our indefatigable contributor Captain J. T. Newbold, M. N. I. we have to announce another curious and valuable paper "On the Alpine glacier, Iceberg

All specimens should be ink (and if possible paint) marked, with a number in India, where damp or insects destroy paper forthwith, and a duplicate copy of the catalogue should be made at the earliest possible moment.

H. P.



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### MARCH, 1845.] Proceedings of the Asiatic Society.

Dilmiat and were transition theories with reference to the deposits of Southern India, its furrowed and striated rocks and rock basins," which to form a valuable addition to our knowledge on these heads, touching which so little is yet known out of Europe.

In consequence of our application to Government, at the suggestion of Colonel Forbes for copies of Lieutenant Yule's memoir and plans relative to the carriage of coal in the Kassia Hills, copies of them have been sent to us from the Military Board and will be valuable as records in this department.

For all the foregoing communications and presentations the best thanks of the Society were accorded,

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Separate articles of the Journal are also reprinted, and sold at proportionate rates.



### JOURNAL

OF THE

## ASIATIC SOCIETY.

Description of Caprolagus, a new Genus of Leporine Mammalia.

By E. Blyth, Curator of the Asiatic Society's Museum.— With two plates.

In the 'Bengal Sporting Magazine,' for August 1843, p. 131, Mr. Pearson has described an animal by the name Lepus hispidus, which I have long been very desirous of examining, and have sought to procure by every opportunity that has offered; and the Society has at length been favored with a fine specimen of it by our esteemed correspondent and contributor, Major Jenkins, Political Agent in Assam, to whose kind exertions in procuring this and other desiderata for the Museum, our thanks cannot be too often repeated.

As I fully expected, this animal has proved to be not satisfactorily admissible into Lepus, as the limits of generic divisions are now currently accepted; but must be regarded as a third generic type of the Leporina, Waterhouse; or rather, it is a very strongly marked modification of the Lepus subtype, and not so distinct a form (equivalent to Lepus,) as is that of Lagomys. In all its more essential characters it is akin to Lepus, but exhibiting very considerable modification in the various details of its structure. The head is large, the eyes small, the whiskers slight and inconspicuous; the ears are comparatively very short; tail the same; limbs small, and much less unequal than in Lepus; and the claws are particularly strong, straight, and very sharppointed, being obviously of important use in the creature's economy: lastly, the fur is very remarkable for an animal of the Leporine group, on account of its harshness, which is well expressed by the specific appellation hispidus.



The skull is much more solid and strong than in any Lepus, with every modification that should contribute to increased strength, but upon the same subtypical model of conformation; dentition also similar, but the grinders broader and more powerful, and the incisors and rodential tusks proportionally much larger: the palatal foramina are reduced so that the bony palate is as long as broad; the ant-orbital foramina are nearly closed by obliquely transverse bony spiculæ, corresponding to the open bony network observable in Lepus; the nasal bones are broad, with an evenly arched transverse section, and are less elongated backward than in the true Hares,-the maxillaries and intermaxillaries corresponding in their greater width and solidity; zygoma also fully twice as strong as in Lepus; the super-orbital processes continued forward uninterruptedly, the anterior emargination seen in the Hares being quite filled up with bone, while the posterior is also much less deep: the ensemble of these distinctions is, however, far better expressed by the pencil than by the pen, and the reader is accordingly referred to the accompanying figures of the skull of this animal, in different aspects of view.

What little is known of its essential anatomy is, as might be expected, identical, or nearly so, with that of typical *Lepus*. Mr. Pearson notices that "the mammæ are from six to ten; cœcum very large, apparently almost like a second stomach: womb double."

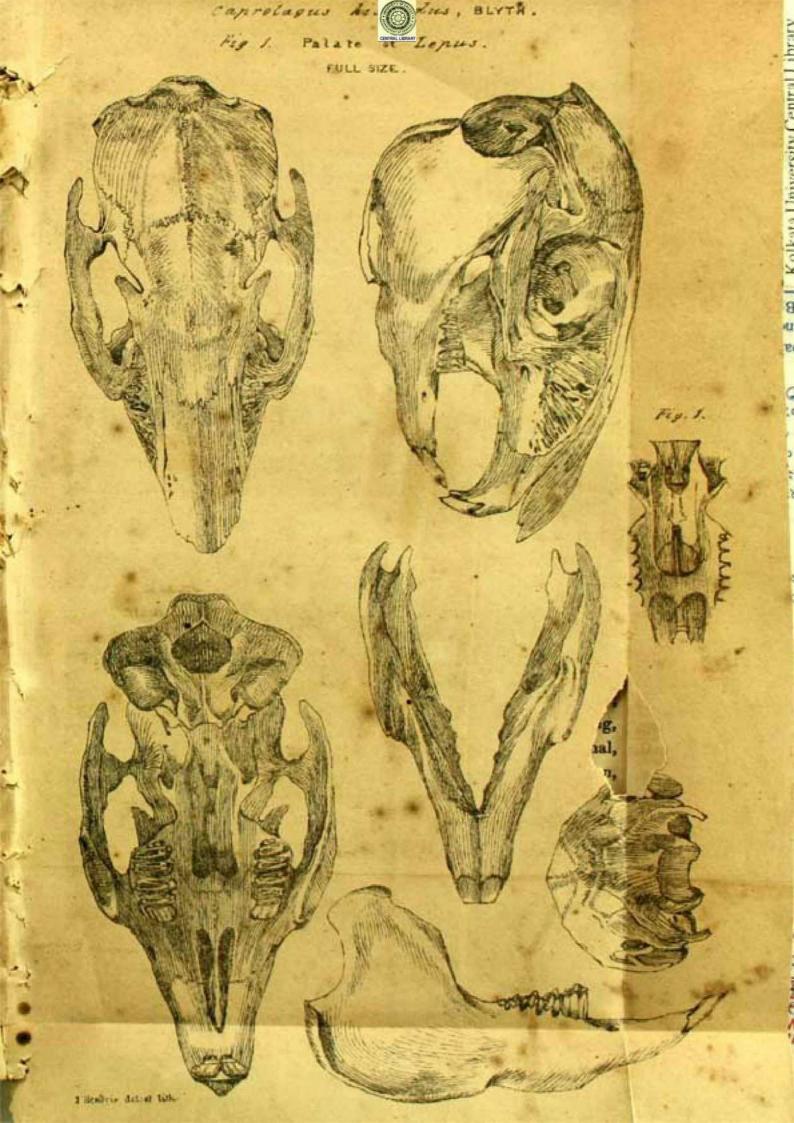
The length of the Society's specimen as mounted, and as represented in the annexed figure, is, in a straight line from nose to tail-tip, fifteen inches and a half; ears posteriorly two inches; tail with hair scarcely one and a half; tarsus to end of claws three and three-quarters; entire length of skull the same: fur of two kinds, that next the body short, delicately soft and downy, and of an ashy hue; the longer and outer fur harsh and hispid, and consisting partly of hairs annulated with black and yellowish-brown, and partly of longer black hairs, all the black having rather a bright gloss: lower parts paler or dingy whitish: toes somewhat yellowish-white: fur of the tail rufescent above and below, except near its base underneath, and not of the same harsh texture as the body fur.

Mr. Pearson, in his original description of this species, remarks as follows: "From the notes of Mr. C. D. Russell, who sent the stuffed



Caprolagus Aispudius (PEARSON) BLYTH.

TWATER SALES LINE





skin from which the description has been drawn up, I learn that the animal was killed on the right bank of the river Teestah, close under the saul forest, and about six miles north of Jelpee Goree. In this place they are said to be very scarce, not above four having been seen by Mr. Russell's party during ten days, though game of all other kinds was met with in great plenty; and the following year the same party killed only one. But towards the hills, as Mr. Russell was told by the natives of that part of the country, they may be met with in greater abundance. Of the habits of this animal little is known. Mr. Russell states, that 'its flesh is white, and eats very much the same as that of the Rabbit'; and from the circumstance of his never having succeeded in putting one up a second time, he is almost certain that it burrows. It is called by the natives of the country, where it was met with, by the same name that they give to the Hare."

Mr. R. W. G. Frith, upon examining the Society's specimen, believes it to be the same animal as has been very often described to him by sportsmen, who have on several occasions been shooting in the extensive sâl jungle in the district of Mymunsing, called the Muddapore jungle, on the western or right bank of the Burrampooter river; but he never chanced to meet with it himself, though he long ago called my attention to the existence of such an animal in that part.

It is included in Messrs. McClelland and Horsfield's list of the Mammalia of Assam, Proc. Zool. Soc. 1839, p. 152, but with the statement that the ears are "very short, not projecting beyond the fur," which is either a mistake, or another species is alluded to; though I believe the former to be the truth: Mr. McClelland remarking, "I am indebted to Lieut. Vetch of Assam for the skin of this animal, but unfortunately the skull is wanting. According to Mr. Pearson, however, it is the same as the skull of the common Hare. It inhabits Assam, especially the northern parts of the valley along the Bootan Mountains." The differences of the skull from that of any Lepus have been already adverted to.

I propose that it should bear the generic name Caprolagus, and be accordingly styled C. hispidus, (Pearson,) nobis.



Report by Lieut. E. J. T. Dalton, Junior Assistant Commissioner of Assam, of his visit to the Hills in the neighbourhood of the Soobanshiri River. From the Political Secretariat of the Government of India. With a map.

Pathalipam Mouzah, January 6th, 1845.—Reached this yesterday evening from Luckimpore station, preparatory to setting out on a short excursion up the Soobanshiri as far as I can go in canoes, and thence to the nearest Meri villages by land. My object being to pay Tema Hazaree a friendly visit, and to ascertain if it be practicable to make a more extended tour through the country of the Hill Meris and Abors next cold season.

This day will be consumed in making the necessary arrangements—to-morrow I hope to start.

January 7th.—On the Soobanshiri. With quite a fleet of canoes, I started from the Pathalipam Ghaut at 11 A. M., and considering the difficulty of procuring boats and the number of people to be provided for, there was less trouble, confusion and delay than might have been anticipated.

Including my own boat there are eleven canoes, thirty-two boatmen, and with servants, Tecklas, Katokees and Meri Bhoteas, a guard of five sepoys; not less than seventy individuals, all packed as tight as herrings in a barrel. The canoes are moved by gold-washers who, from constant practice in their gold-washing expeditions, are masters of the art of managing boats in the difficult rapids of this river. Indeed I am told that no other men could venture to work up in canoes to Siploo Ghaut, whence we are to proceed by land. The canoes are very small, and, except a light mat over my boat, no choppers allowed.

Amongst these gold-washers are the Pawwas men, whose business it is to convey the Hill Meris and their families who annually visit the plains by this route from Siploo Ghaut to a Ghaut about six miles above Pathalipam. These men, six in number, being most expert of all, act as our steersmen.

They use paddles of "Hingoree," short and stiff in comparison with the long elastic "Bhola" paddles of the Suddiah and Debroo Thooms. They work the boat however exceedingly well; and no doubt in the pattern and material of their paddles, they have adopted what experience has taught them to be most serviceable for the rapids of this river. In the shallows I see they chiefly work with the luggee poles.

1845.7



There is a rapid, but a slight one, immediately above Pathalipam; and from this to the Hills the river is divided by wooded islands into numerous channels: two of these islands are partly occupied by Chuttiah Meris, and they are moreover a fruitful source of quarrelling among the gold-washers. On one of them, called "Indoor" Majali, they brought to our canoes, and commenced making preparations for halting there. I protested against this, as it was not 4 o'clock; but they asserted very positively, that there was no ground on ahead fit for encamping on that we could possibly reach that night, and as I liked the appearance of the place, a fine shelving beach of sand and gravel, I gave my consent.

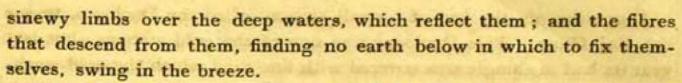
They waited till my cook had arranged his temporary kitchen and the dinner was in course of preparation, and then their object of halting on this island was made manifest. A number of gold-washers from the Bor Dolonee Mouzah, on the left bank of the river, were washing a little above the halting place. The Pathalipam gold-washers considered the ground theirs, and wished me to serve the intruders with a summary ejectment. The left bank people as stoutly asserted that they were on their own ground, and it was by no means an easy dispute to decide. It depended on which of the channels is the main channel of the river, but the river takes to them all in turn about.

January 8th. Started after all had breakfasted at 8 A. M. The back ranges of the mountains are disappearing one after the other behind the upstart lower hills. The rapids numerous, but not difficult.

The Sonaris have boat songs, or professional melodies of their own: when wading and hauling the canoes up the rapids they sing a sort of "cheerly boys," the chorus of which is "Yoho Ram," and which heard above the roar of the waters has a good effect. In hollowing out these canoes the carpenters make in them holes of about an inch square to ascertain the thickness as they proceed. These holes are afterwards plugged. In my boat being driven in from above they protruded below, and two of them were at the same moment unshipped as we bumped on the stone of a rapid. The boat commenced rapidly filling, but we got her on shore and the baggage all removed, before any serious damage was done. I mention this as a warning to others. One minute's delay and the boat would have sunk; we were fortunately near shore, had surmounted the rapid, and the crews of the other boats all at hand in a moment to assist.

Digression up the bed of a small stream called the Doolooni, to see the Raj Ghur. This Doolooni was one of the gold streams; but last year its bed of shingle was covered with fine sand which the gold-washers can make nothing of, and they have abandoned it. It forms also one of the passes by which the Turbotiah Meris descend, the Dirjot flowing through Sugal-doobey, which forms the other starting from near the same point in the hills. The Raj Ghur we found about a mile from its mouth. I have seen this Ghur at Goomeri, where it crosses the Booree river, and there it still bears the appearance of having been constructed as a rampart against the inroads of the hill people; but here it has more the appearance of an old road. It is however a stupendous work, and great is the pity that it is too far north of our population to be used as a line of communication. Previous to the Moran or Muttock wars, the villages of Luckimpore are said to have extended up to this Raj Ghur, and there is every appearance even now of such having been at some period the case. At the mouth of the Doolooni the Soobanshiri expands with a fine broad, deep and smooth basin, which it enters by three channels formed by two islands, where the stream again meets; above them it emerges from the hills, and here we halt for the night : our encamping ground is in the dry bed of the Bergoga.

January 9th. Our last night's bivouac was not a comfortable one. A stiff breeze blowing down the bed of the Bergoga, was met by another coming down the valley of the Soobanshiri, and they enjoyed themselves together at our expence, blowing the sand into the people's dinners, and the smoke into our eyes, and knocking the canoes against the stones. But we are now fairly amongst the hills, and truly the scenery is sublime. Beneath these hills, the great river winds in graceful serpentines. The basis forming the cliffs are rocky and precipitous to a considerable height, along which foliage of various hues and a most vernal and velvety appearance waves in the breeze. The stream is about 250 yards in breadth, but of a depth (sounded several places on returning and found between sixty and seventy feet in depth throughout this glen) unfathomable by any means we have at hand. There the rock of storms (the Botahkowa hill) stands boldly out from the mass on a bed of huge boulders screening the mouth of a deep, dark, narrow dell, the winding of which I explored for a little way-a way, where the sun's rays never penetrate; sometimes huge Bon-trees springing from the rocks above stretch their



As we advance the river becomes still narrower, but not less deep or smooth. Gockain Potana, a rock not less than 800 feet in height, rises perpendicularly from the stream. The face is almost smooth to the top which is clad with trees; on the opposite side a similar cliff, but not so high: on the summit of the former a god killed a deer; and, walking (clever fellow) down the face of the smooth rock with his quarry over the shoulder, he ascended with it the opposing cliff, unde nomen. From above, the rock called the Gockain Potana looks like a huge churchsteeple rising from the stream. We stopped for sometime at a place called Pabo Ghaut to collect cane to be used in towing the canoes up the rapids on ahead. The Ghaut is so called from its having been some 50 years ago the watering place of a tribe of Meris called Pabon. One of the young men of this tribe stole from her village a young virgin of Tema's tribe, then under the management of his father Temees. For this offence the insulted Temeeans waged a war of extermination against the Pabo tribe. The villages of the latter were attacked by night when the inhabitants slept, and men, women and children were promiscuously slaughtered or carried away, and sold into hopeless captivity amongst the Abors. The tribe, consisting of two large villages, were utterly extinguished. Not far from this we halted for the night, on the right base of the river, at the mouth of a beautiful stream called the Gaien Panee, issuing from a dark glen and dashing down the rocks into the wellbound channel through which the Soobanshiri noiselessly flows. Notwithstanding the absence of large timber which appears to grow only near and on the summits of these precipitous hills, the verdure of this valley is very beautiful: the rocks themselves are frequently covered with moss and ferns of the brightest emerald green; whilst springing from the soil above them bamboos of a peculiarly light and feathery appearance, the shafts not thicker than the most delicate trout rod, curve and waive in the slightest breeze. The pine-apple tree, the drooping leaves of which are found upwards of sixteen cubits in length; the Toka palm, varieties of cane and the mountain plantain, are all characteristic of this scenery, and blend together in luxuriant mass.

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ΓNo. 160.

10th. Early this morning we emerged from this great glen, and found the first of the great rapids at its mouth. The canoes were safely pulled up with the long cane ropes we had provided; above this rapid the stream widens, the valley expands, and more distant mountains appear in sight. Huge blocks of rock obstructing the river in its descent render the navigation more and more difficult. We were obliged to lighten our boats, and for some distance the baggage was all conveyed by land, whilst the canoes were dragged through fields of hissing foam, or over rocks nearly dry; after surmounting several such rapids we reached Siploo Mookh whence we are to proceed by land.

## Luckimpore, February 11th, 1845. February 21st.

My DEAR MAJOR,—This being a holiday, I shall devote it to giving you some further account of my late excursion.

I wrote you a few lines from Siploo Mookh, detailing briefly my proceedings up to the date of my letter. On the 15th January all the headmen of Tema's tribe made their appearance, together with the ladies of Tema's family, who came expressly to welcome me-his two wives and daughter. I held an assembly, and particularly explained to the chiefs that if they had the smallest objection to my proceeding further I was ready to return; but they all assured me that such a proceeding would cause them great pain. They would be delighted to shew me all the lions of their country; but only begged, that as the small-pox was raging in the Pathalipam village, I would leave behind me all the Pathalipam men. This I readily consented to do, provided they procured me a sufficiency of Meri coolies. Affairs having been so far amicably arranged, a distribution of salt and rum concluded the conference; and the Gaums in high good humour disported themselves before me, shewing their agility in racing over the rocks, and their prowess in throwing stones across the river: mean time I gave the ladies who had come to greet me some gay colored cotton cloths; and here, alas, was cause for jealousy. The other Gaums would know why Tema's family alone should be thus favored; but I told them that when their wives and daughters came to greet me (as Tema's had done) and were neglected, they might take umbrage at my

partiality, but not now; and with this they appeared satisfied. Late at night Tema and one of the Torbottiah Gaums again visited me. They said a sufficient number of coolies would by morning be collected, but they expected to be paid for the trip; considering the friendly nature of my visit, and the honor thus done them, they (the Gaums) were ashamed to ask me to pay the people for conveying the baggage, but they had no power to give men without such payment being made; and they therefore wished, if agreeable to me, to be allowed to defray the cooly expences between them. Of course I declined this offer, though I was not a little pleased at its having been made, evincing as it did a genuine good feeling towards me. The rate was to be one seer of salt, or four annas, for the trip for each cooly, which the Gaums assured me was what they paid when, in bringing, as they yearly do, various commodities from the plains, they are necessitated to avail themselves of extra hands. Those who call themselves Gaums have no authority in their hills, but that of the rich over the poor. After the above noticed trait of liberality on Tema's part, and of the independence of the Hill Meris in general, I was not a little amused next morning when the Meri coolies, male and female, were receiving beforehand their seer of salt, to observe amongst the applicants for a load and a douceur, Tema's second wife and his eldest daughter, both fine young women; but the latter much disfigured by small-pox. The loads were light, not more than twenty seers: but boys and girls, men and women, were all paid the same rate. Considering all these arrangements had to be made, and that the greater part of the coolies had only arrived in the morning, I thought myself lucky by getting off by 101 A. M. For the first two miles we proceeded along the left bank of the Siploo flowing from N. W., then turning north ascended a very steep hill; sometimes almost creeping under jungle so dense, that nothing could be seen beyond what was a few yards to our right and left : the path was less difficult than I had been led to suppose it, but is sometimes zigzagged up or wound round precipices in an awkward manner for nervous people. Tema was my constant companion, always prepared to give me a friendly hand if necessary. He seemed at first to be under great anxiety on my account ; but finding me more active than he expected, he appeared more at ease.

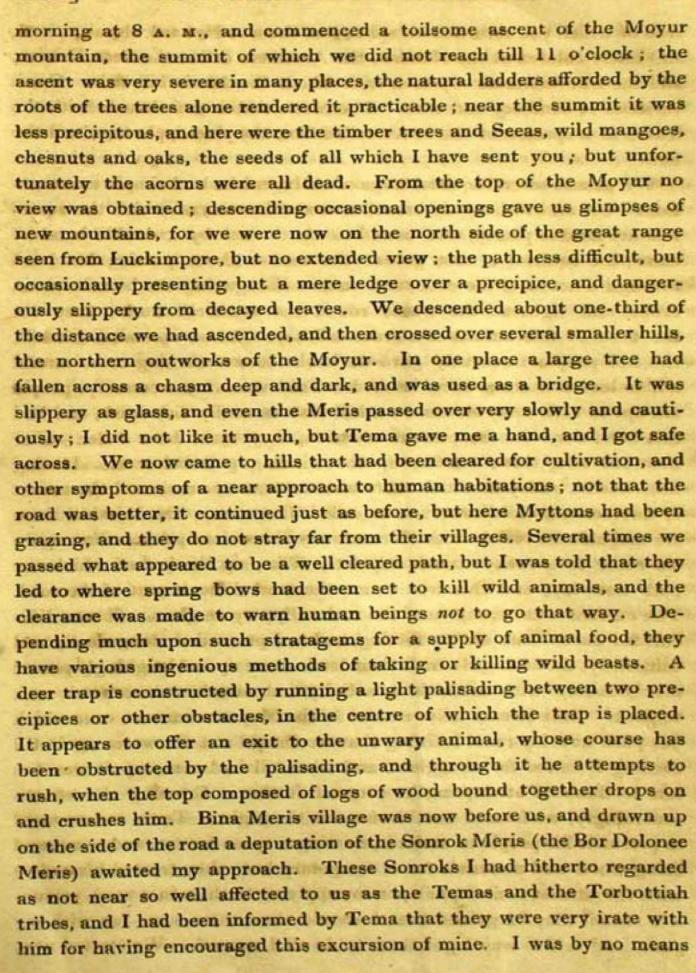
Of the various timber trees and underwood, you know I am incapable of giving any account; the most remarkable of the former were Seea trees, a



seed of which you returned me split open, the wood is hard, close-grained, and finely colored as the Nahore; the Assamese call it the Seea Nahore, and the fruit contains a poison with which the Meris kill fish. Great varieties of bamboos and cane. The Meris thatch their houses with the leaves of a species of the latter called Tor, the pine-apple tree, and the fern.

We passed several squirrel traps of an ingenious and simple construction. On an overhanging branch a seed (chesnut) of which the squirrels are fond is placed, and bound to the branch by a double band of cane; the squirrel cannot get at the seed without putting his head through a noose of the cane, and on his disengaging the bait the stone drops and tightens the noose round the squirrel's neck: they eat the flesh of this animal as a great delicacy. As we ascended this hill, the hill people frequently gave us lowlanders a warning to be careful not to loosen a stone from its bed. This was very necessary, people are apt to kick away stones on a hill that are easily dislodged; and had this been done on the present occasion, they must have fallen on or bounded near those coming up the winding path below us. Having descended a valley in which there was water, we commenced the ascent of another and loftier mountain called Teepooka. On this hill there are magnificent Nalok trees of enormous dimensions; descending again we came to a rocky stream called the Tiks, up the bed of which our path now lay, and this was to me the most difficult part of the road. The current was strong, and the rocks slippery as glass. It was difficult for me to maintain my footing, and as I proceeded along slowly and cautiously, the Meri girls with their loads came up and laughingly passed me, bounding with astonishing activity and sure-footedness from rock to rock. This stream takes its rise in the Moyur mountain, over which our path now lay; and learning that we should not see water again till evening I halted for stragglers, and when all had come up it was too late to think of attempting to proceed further. Crossing the stream accordingly, we formed our bivouac for the night. Tema endeavoured to persuade his people to assist in clearing a space for me, and to cut and bring wood and materials for a temporary hut; they treated his orders with the utmost contempt: upon my applying to them in a more persuasive strain, they bargained that I should shew them some fun with my guns, and in this way I got them to do all I wanted. We started next





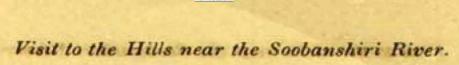


anxious to meet them, and had not invited them to an interview : but here they were, and I could not decline it; so putting a bold face on the matter, I took a seat under a tree and gave them an audience. After having explained my object in visiting these hills, and thanked them for their civility in coming to meet me; very much to my surprise, instead of any objections being raised, they gave me a most cordial and pressing invitation to proceed to their villages too, saying as I had come as a friend to visit Tema, it was not fair that the honor should be conferred on him alone; they too were most anxious to entertain me, and would gladly provide every thing necessary. One of their villages, that in which the principal Gaum resides, was an easy march from where we stood. They did all they could to induce me to go, overruling all my objections as started. I had only supplies for three days,-they would provide every thing. At last I said it would be improper for me to go to their village without bringing with me some presents to bestow on their wives and daughters to cause them to remember my visit. That of the few things I had brought of this description, had been disposed of, or were bespoke, and were I now to go empty-handed to visit them, they would all say that I had bestowed many marks of favor on Tema's people and to them had given nothing. I therefore could not now go; but if all turned out well, and they behaved themselves properly on their next visit to the plains, they should receive a visit from me at another season intended for them, as my present visit was for Tema. With this they appeared satisfied, and only further begged that I would excuse the old Gaum coming to meet me in another Gaum's village, which would be derogatory to his dignity, and allow him instead to pay his respects at Siploo Mookh, or on the road down. This was so ruled, and thus quietly ended the conference with the ferocious Sonroks. Bini Gaum's village which we now entered, is situated on one of the low hills under the Moyur mountain; the houses are long, and raised considerably on posts of cleft timber, indiscriminately constructed on the top or side of the hill, but the level of the flooring is tolerably well preserved by varying the height of the supporting posts. It contains only ten dwelling houses; but as each house holds an entire family, including brothers and their wives, and married sons and their children, each may on an average contain about twenty individuals. The situation of the village is very beautiful. The

low hills around,-some partly cleared for the purposes of cultivation, some entirely so, and now covered with the straw of the crop last reaped,-appear in fine contrast with the dark tints of the lofty mountains of Moyur and Yaloo, and others more distant that surround it. The inhabitants, men, women and children, far from evincing any signs of fear, crowded about me as I passed through the village. The road from this to Tema's village, which is about two miles distant and northwest of this village, continues over low hills, many of which have been cleared and are now fallow, and after a time will be again taken up. Between the villages barricades are constructed in different places to keep the Myttons from the cultivation when necessary. We followed the windings of a stream called the Kutoo, and were led by it into a pretty little valley comprising a level space of cleared ground of some extent, watered by the Versing river which winds round the hill on which Tema's village is built, and here we encamped; Tema's village within hail above us to the S. E., the river flowing from the N. W. Here were assembled to meet me, besides the notables of the three villages of Tema's, or the Pambottiah tribe, all the headmen of the Torbottiah dewar. They\* seemed to wonder much at my visit. What could it portend? and to be in some alarm; but this soon wore off. They describe their country as much better worth seeing than this. The villages are larger, more numerous, and nearer to each other than those of this dewar; the nearest a day's march from this, about twelve miles in a direction north by west. The villages are six in number, and within hail of each other, on hills as Tema's and Bina's, and the houses similarly fashioned; their cultivation is more extensive, the crops fewer, and more varied. They have asso, dhan, and hali; but the latter is not planted out. They sow the seed as we sow peas. They kept me talking till dinner time, and then all retired with Tema, who had a grand feast, not less than eighty individuals were entertained by him; all that came to see me were invited, and I am told his house was crammed: nor were we neglected, a fine fat kid and fowls and eggs, yams and sweet potatoes and Indian corn were supplied. Tema asked me if I would drink mhud, the spirit they distil; but this I declined, or doubtless a large supply would have been sent.



Next morning I proceeded to the village, and found them all busily engaged in divination as to whether my visit was to bring them good or evil. I was told that the auspices were favorable. A man sat apart from the rest holding in both hands a puny chicken, and invoking all the spirits of the woods by name. Those deities who delighted in the blood of Myttons, and those who rejoiced in the slaughter of pigs; those who were propitiated by the sacrifice of fowls, or those who were content with a vegetable offering, all are on such occasions invoked; and after the Chout is terminated, the chicken is cut open and the entrails examined, from which they augur good or evil. Often as this "auspicium" to my knowledge has failed them, they most pertinaciously adhere to the practice; and undertake no expedition, journey or work, without consulting it. I was sketching, and when the "auspiciums" were being taken, and when the ceremony was concluded, they sent to me to beg of me to return to my hut to give audience. I desired for peace' sake to give it where I sat; but the Torbottiahs who wished to pay their respects in regular form, could not, they said, with propriety do so in Tema's village. However, previous to desceding I paid Tema's house a visit, to which he made no objections. The house is seventy feet long, raised on timbers, some perpendicularly and some diagonally placed, in which is laid a platform of bamboos for a flooring. The roof has gable-ends, and is pitched very high; the thatch being composed of the leaves of a species of cane as before mentioned. Under the gables a cross chopper covers in an open balcony, one at each end. The interior consists of one long apartment sixty feet by sixteen, from which a passage extending the entire length is partitioned off. In the large apartment down the centre no less than four fires were burning on hearths of earth. On one side were ranged, with some appearance of order, their arms, pouches, travelling apparatus, &c.; another portion of the apartment was decorated with trophies of the chase. In the centre between the fires frames of bamboos suspended from the roof served as tables, on which various domestic utensils were deposited. I had hoped that the passage which was partitioned off from this apartment contained the dormitories of the family, but on examination it was found to be the mhud cellar. In it were ranged conical baskets lined with plantain leaves, in which the mhud is fermented, and received in vessels placed underneath: in the large apartment the whole family eat, drink and sleep.



Tema and his wives in the upper end or first fire, his sons and daughters round the next, other members of the family round the third, and slaves and dependents round the fourth. Fearful of being pillaged by the Abors, they do not venture to display much property in their houses. The greater portion of it lies buried in some remote spot known only to the heads of the family. Besides cattle, ornaments, arms and wearing apparel, it consists of large dishes and cooking vessels of metal, and what are called Dao Guat, such as little bells with various devices and inscriptions, in what I fancy must be the Thibetan character; but I know it not. The Meris do not know where they come from; a few are occasionally obtained in barter with the Abors, but the most of them have been handed down as heir-looms in the family, and they are regarded as the most valuable portion of their property. They are occasionally used as money, and valued at from four annas to twelve rupees each, according to shape, size and ornament. Those with inscriptions inside and out are most highly prized. Those without inscriptions are little valued. These bells are common amongst the Dufflas, who can give no better account as to how they became possessed of them. I am told the Butias sell them, and if so you can perhaps tell me something of their origin. The Meris tell the same story if asked where they get their fine blue beads, i. e. that they are heir-looms; very seldom, they say, are they now procurable in barter or exchange, though some few are occasionally procured from the Abors.

It is not impossible that numbers of these bells and beads thus handed down as heir-looms may have been brought with them from the country from which they originally emigrated. Regarding their migrations they have no traditions. They believe, and they are not singular in the belief, that many orders and races of men were created, whom the Creator allotted to dwell where soil and situation were best adapted to the constitution and habits he had given to each; and thus that the Meris were created for, and have ever dwelt in these hills. Their religious ideas are very vague. They believe in a future state, and have an indefinite idea of a spirit who presides in the regions of departed souls, as is shewn in their mode of disposing of their dead. The body is interred fully clothed and equipped with arms, travelling pouch and cap, in a deep grave, and surrounded by strong timbers to prevent the earth from pressing on it. Nor do they omit to supply



the departed for his long journey with food, cooking utensils, and ornaments of value, so that he may make a respectable appearance in the other world. They attach great importance to their dead being thus disposed of and buried near the graves of their ancestors. If a man of any influence dies in the plains his body is immediately conveyed to the hills to be so interred, should the disease of which he died not be deemed contagious.

Marriage, although its violation is considered the direct of offences, is with them a mere matter of barter or exchange. Young ladies are in the first instance valued according to the wealth and respectability of their parents. The price is such that few suitors are able to make it up for several years after preliminaries have been arranged, and they pay it accordingly by instalments. It consists, if the damsel be of high family, of two or three Myttons, twenty or thirty pigs, fowls, mhud, and sometimes clothes. When the parents are content, or the stipulated amount has been paid, they invite the suitor with his family and friends to come for his bride, and he is entertained that day by the father of the lady. On his return with his wife all the friends and relations accompany him, and the bridegroom or his parents now in their turn have to feast them and his own friends into the bargain for several successive days. There is no further ceremony. The parties are now considered man and wife; and woe be to him that seduces from her lord the wife so wedded. The adulterer is seized and securely bound, detained under most rigorous treatment for a day or two. If he be powerful his friends come to his assistance, and make offers for his ransom, which must be considerable to be accepted; but the chances are, he is left to his fate, and if such be the case he is put to death. The woman who has committed the faux pas is less severely dealt with. A little wholesome chastisement, and she is again admitted into the family circle. It must not be omitted that when a marriage is concluded, the bridegroom expects to get fair value with his bride for his pigs, &c. that he has expended on her. If personally, or in default of an adequate trousseau she be found wanting in this respect, there is a dinner, an assemblage of the mutual friends, and the parents of the bride are made to disgorge should it be so determined; or should they refuse, their daughter is treated as a slave, and not as a member of the family: notwithstanding this, a widow cannot leave her husband's family and heirs to contract a fresh



marriage unless she can find the means of defraying all that was originally paid for her; if she can do this and furnish a feast on the occasion, there seems no objection to her making a second alliance. The costume of the women is peculiar: a short petticoat extending from the loins to the knees is secured to broad belt of leather which is ornamented with brass bosses, besides this they wear round their middles an infinite number of rings made of filaments of bamboo embroidered with the fibres of another plant. A band of similar material, from which a bit of cloth is suspended in front, is bound tightly round the breast under the arms. This is their travelling and working dress; but at other times they wrap themselves in a large cloth doubled, brought over the shoulders, and pinned in front like a shawl. They wear round their necks an enormous quantity of beads, mostly of blue, like turquoise, but also of agate, cornelians and onyx, and glass beads of all colors. They have bracelets of silver or copper, and anklets of finely plaited cane or bam-Their hair is adjusted with neatness, parted in the centre and hanging down their backs in two carefully plaited tails. In their ears they wear most fantastic ornaments of silver, which it would be difficult to describe; a simple spiral screw of this metal winding snakelike round the extended lobe of the ear is not uncommon amongst unmarried girls; but the ear ornaments of the matrons are much more complex. They generally have very sweet countenances, though few could be called handsome. The almond-shaped eye is common, but not universal; mouths generally well formed; and teeth, notwithstanding the free use of tobacco, very fine and white; their complexion what the natives of India would call fair, but they have rosy cheeks and ruddy lips, which is a decided improvement on the Assamese complexion; they are very stoutly built, generally short of stature, but to this there are remarkable exceptions. The men have fine muscular figures; many of them tall and with good features, but the countenances of some are repulsive. The variety of feature denotes an admixture of races, and no doubt many of them have Assamese blood in their veins, but usually there is the high cheek-bone and almond-shaped eye, lips rather thin, and face devoid of hair except a few over each extremity of the mouth forming an apology for a moustache. They gather the hair to the front, where it protrudes out from the forehead in a large knob secured by a bodkin;



round the head a band of small brass or copper knobs linked together as tightly bound. In their ears they as well as the women wear a variety of ornaments, but of a distinct kind. The lobe is distended so as to hold a knob an inch in diameter. It is gradually enlarged by the insertion of a roll of the leaf of the pine-apple tree. The chiefs wear ornaments of silver, shaped like a wine-glass or egg cup; young men do not venture to attach so heavy a weight to the slight ligament, and insert a hollow plug of silver instead. The males also wear a profusion of the blue beads before mentioned, and others, all very large. Their costume is simple enough-a band round their hips composed of rings of bamboos, the same as worn by the women but not so numerous; an apron attached thereto before and behind, and a cloth wrapped round their body and pinned so as to resemble a shirt without sleeves; a cap of cane or bamboo work with turned-up peak, which however is worn behind, and over their shoulders as a cloak, which also serves as a pouch or knapsack, they throw a covering made of the black hairy fibres of a plant, which at a little distance resembles a bear-skin. Their costume is not complete without placing on their heads and over their caps a piece cut out of tiger or leopard-skin, the tail of which hanging down their backs has a droll appearance! They are all very filthy in their persons, many of them appear never to have had their faces washed since their birth. As this was not their cultivating season, and the crops had been reaped, it was chiefly from information that I could note any thing on the subject. Each village has a certain extent of ground, comprising hills, sides of hills and valleys, which they have been in the habit of cultivating from time immemorial; but not more than a fifth of this ground is under cultivation each season. They cultivate each patch two successive years, and then suffer it to be fallow for four or five, taking up again the ground that has been longest fallow in lieu. They have a superstition, which deters them from breaking up fresh grounds so long as their "Gra" (fallow) is sufficient-a dread of offending the spirits of the woods and forest by unnecessarily cutting down the trees. In Tema's village the chief crops are "Bobesa" or bobsa dhan, the grain of which is large, pear-shaped; and goom dhan, or maize. Many of the villages have acosa and hali, resembling that which is grown by the Assamese; but the cultivated 1845.]



tracts appertaining to this village get too little sun for those crops. The bobsa and goom dhan are sown in the same ground and at the same time, and round the squares which contain these crops they plant yams and other edible roots; they have not got the potato, but it would most likely grow well and be serviceable to them; they sow red pepper, which succeeds admirably. Tobacco is generally grown in patches near the houses. The labour of cultivation and all labour falls chiefly on the women. They have few of them other implements than their daws, which are used to clear, cut and dig with. The men consider it sufficient to occupy themselves in hunting and attending to their various snares and spring bows for wild animals, and when the season arrives for the trade, in collecting manjeet, which is performed by both sexes.

The manjeet grows in steep declivities, interlaced and entangled with other shrubs, so that it is not easy speedily to collect a quantity, at least all that I found of it was little; the leaf of the genuine kind is small, narrow and pointed, and slightly suffused with a tinge of the colouring matter. There is a bastard kind also found in great quantities, the leaves of which are very much larger and the plant altogether coarser in appearance; it is called the female manjeet by the Meris, and though similar in growth with the other, its flexible shoots contain scarcely any colouring matter. Nevertheless, it is sometimes brought down mixed with the finer. The Meris assured me that this fraud was not theirs, but was practised upon them by the Abors. I recommended them for their own sake to bring down none but the best, and they promised that none other should leave their country. They collect and tie it up in bundles when fresh and flexible, then lay it on frames or hang it up to the eaves of their houses to dry; when it becomes rather brittle, it is fit for exportation. The Mytton is the only species of horned cattle possessed by the Meris. It is rather a clumsy looking animal in make; but a group of Myttons grazing on the steep rocky declivities they seem to love, would be a noble study for Landseer; some are milk-white, some nearly black, some black and white, and some red and white. To the Meris they are only useful as food. On festive occasions one is killed, and I should think the beef must be excellent; they feed most delicately on young leaves, and keep in excellent condition. The



cows would, I have no doubt, give a large supply of milk; but the Meris have not yet found this out. I asked them to procure some for me, but received the usual answer, "Meris don't know how, not our custom." The females appear tame, and submit to be tethered; the bulls rove their own masters, but do not wander far from the tethered females, so are in a measure tethered too; just now they all roam where they please, but when the crops are on the ground a mountain or so is fenced round by strong timbers from tree to tree, and into this enclosure they are driven, and remain till the harvest is stored. They have pigs and poultry in plenty, and a few goats. I suppose there are no people on the face of the earth, more utterly ignorant of every thing connected with the arts than are the Hill Meris. With the sole exception of the bands and other articles of bamboo cane and fibres above-mentioned, which the women are everlastingly making, every thing they use is imported; were their communications directly with the plains, and indirectly by means of the intervening tribes, with the civilized countries on the other side of the great range cut off, the use of metal and of women's clothes would be lost to them. The Abors can forge themselves daws, but the Meris know not the art. The most distant tribes manufacture coarse cotton cloths; but though the Meris are in constant communication with them, as well as with us, they have not the remotest idea of weaving. They cannot journey two or three days from their village, without having to cross a considerable river. If it be not fordable, a rough raft of Kakoo bamboos is hastily constructed for the occasion; but though constantly requiring them, and annually using them, they have never yet attempted to construct a canoe: this is the more strange, as the Abors of the Dabong push a considerable trade in canoes cut in the rough. I suppose that until the Meris discovered the fertile plains of Assam, which they were first led to visit by having killed birds in whose bellies they found rice, and discovered by proceeding, in the direction of their flight, they were mere savage hunters; the skins of beasts their only clothing, and the flesh their chief, if not only food.

Could they be stimulated to a more industrious course of life, they might considerably improve their commercial relations with us. The great rivers that enter their country abound in gold grains; the process 1845.7



of washing is simple, and the Meris have had for two centuries constant opportunity of watching it in all its phases.

The last process of separating the gold from the remainder of the sand or scoria, they might leave to the Assamese gold-washers; but the rough washing with the doorunnee and bottle gourd might be performed by them, and a considerable quantity of gold introduced. The doorunnee, or tray, is very simple and easily made, and the gourds are obtained from the Meris by the gold-washers. This would be a most lucrative trade for them. By a little attention to the manjeet also, which they are too lazy to give, its growth might I think be improved and its collections facilitated, simply by the removal of other plants that choke it. I have not much more to say; but I may send you another chapter\* if you are not tired of me and the Meris. But this letter has grown to such a length, I fear you will be inclined to throw it into the fire without reading it.

I have no doubt that there are sundry errors in this account; but I cannot stop to correct them, for I feel sure if I were to read over what I have written I should hesitate about sending it. I had not intended sending you the journal up the river, it was copied to send home with sketches; but as you seem interested in the scenery of the Soobanshiri, I have ventured to add it.

Yours very sincerely,

(Signed) E. T. DALTON.

(True Copy,)

(Signed) F. Jenkins,

Agent to the Governor General.

(True Copies,)

J. CURRIE,

Secretary to the Govt. of India.

<sup>\*</sup> Trade with us and with Abors; position of villages; rough estimate of population; Abors, Accas, not yet touched on. All these however might be included in a public letter applying for leave to make a more extended excursion next year.



Notes, principally Geological, on the South Mahratta country—Falls of Gokauk—Classification of Rocks. By Capt. Newbold, F.R.S. &c. Assistant Commissioner Kurnool.

The reader has already been introduced into the South Mahratta country at its eastern angle near the confluence of the Kistnah and the Gutpurba.\* We will now proceed westerly across it, following the right bank of the Gutpurba to the Falls of Gokauk on the Eastern slope of the Western Ghauts, leaving the Kolapore territory to the right.

I crossed the Kistnah about two and a half miles below the Sungum, or confluence, and passed up the opposite bank towards the tongue of land formed by the junction of the rivers. The apex consists of silt, sand and clay, in regular layers, rising, as they recede, to the height of about sixteen feet above the surface of the water.

A section of these layers was afforded in the sides of a deep cleft running down to the Gutpurba. They present a striking illustration of the formation of fissures in sedimentary rocks, simply by the mass contracting in consolidation, unaided by subterranean movement or displacement, which we are compelled to call in to our assistance in explaining the great faults and displacements, attended with scorings of the faces of the fissures, and the polishings termed "slickensides," so common in the coal measures, and other old sedimentary rocks of Europe. Earthquakes, another cause of fissures, are unknown here.

The fissures in these layers of silt and clay are usually vertical, and widest in the more consolidated layers; their course is often zig-zag, like that of the celebrated gap in the sandstone rocks of Gundicotta through which flows the Pennaur; or, like the fissures in the Regur deposit: during the hot months they frequently intersect each other.

Horizontal seams, independent of the parallel laminæ of deposition; have been formed, partially filled with a titaniferous iron sand, which owes its arrangement, and segregation in distinct layers partly to its greater relative specific gravity, and partly to the motion of the water.

The truth of this is easily illustrated by the simple experiment of mixing intimately some common quartzose sand with a portion of the



iron sand, and throwing them into a tumbler a quarter full of water.

If the tumbler then be inclined to one side, and gently moved so as to cause the water to move backwards and forwards over the surface of the sand, the particles of quartz and iron gradually separate and become arranged in distinct layers.

The upper beds of the section are of loose silt and sand, the lower layers are more consolidated, and towards the base of the cliff thin layers of an indurated liver-brown marl alternate; both the silt and marl effervesce slightly with acids. At the bottom of the fissure runs a rain channel, which has washed the sides into salient and re-entering angles. In some places they have been excavated and undermined by it, and portions of the superincumbent layers have fallen in. In short, we see on this diminutive, yet true scale, all the striking features of precipice, ravine, pinnacle, and castellated form so remarkable in the sandstone and limestone formations.

Tabular cavities appear in many portions of the cliff which have neither been caused by snails, nor other boring conchifers. They have originated from the stems of long grasses, around which layer after layer of silt, &c. had been deposited until the stem decayed away, leaving an empty cavity modified by the action of the rain trickling down it into the substance of the rock. In many of these cavities the grasses are still seen. The iron sand is slightly magnetic, infusible per se before the blow-pipe; and forming with difficulty a blackish slag; it tinges borax of a brownish green. It has probably been derived from the neighbouring trap formation.

The Rivers Kistnah and Gutpurba. The Kistnah near the confluence is apparently about 500 yards broad, and the Gutpurba about 100. The current of the former had a velocity of about two and a half feet per second, and the latter about two and three-quarter feet.

The temperature of both rivers, one foot below the surface, was exactly the same, viz. 76° 5′. Temperature of air in shade 76°; in sun 84°: month July, river swollen by the monsoon freshes. Mean temperature of the South Mahratta country at Darwar, according to Christie, is about 75°. As both rivers were nearly full, there was no opportunity of examining the size and nature of the pebbles in the bed. On the banks are scattered water-worn fragments of chert, quartz, granite, trap,

felspar rock, hornblende schist, jasper, lateritic conglomerate, kunker, ferruginous clay, greyish blue and sand-coloured limestone, sandstone, and calcedony. None of the fragments that had been transported by the current were more than three or four inches in diameter.

A tumbler-full of the turbid water deposited about 1-20th of its bulk of a fine sandy brown sediment, which effervesced with acids; very different, like those of the Bhima, Godavery, Tumbuddra and Cauvery, from the regur, which, as before mentioned, is supposed by some geologists to be a deposit of these rivers. The freshes of the Kistnah do not, according to the testimony of the oldest boatmen, ever overflow the banks more than half a mile; and its inundations at Danoor, and other places where I have crossed it, rarely spread to a greater extent. These facts argue strongly against the theory of the fluviatile origin of the regur which is seen covering vast flat plains like seas, which extend, I may say, hundreds of miles from the banks of these great rivers. With regard to Christie's theory of its being the detritus of trap rocks, I have before observed that the iron contained in them oxidizes, becomes ultimately reddish or coffee-coloured in weathering, and imparts its colour to the detritus; and that the alluvium we now see brought down by the Kistnah, Bhima, and Godavery, which rise in and flow over the great trap \*formation, is of a brown colour, very different from the bluish black of the purest regur. One of the richest and most extensive sheets of regur in Southern India, is that of the Ceded Districts, which is watered by the Tumbuddra, Pennaur, and Hogri rivers, the courses of which on no point touch the trap formation, passing over plutonic and hypogene rocks, sandstone and limestone. If the rich sheets of regur which cover the plains of Trichinopoly, Artoni, and Cuddapah had been derived from the great trap formation, one would naturally expect to find in it, or associated with it, grains or fragments of calcedony, agate, jasper, heliotrope, and other hard minerals so abundant in the overlying trap: but there is no instance on record of such fragments having been found in these regurs.

The regur is seen too, far above the present drainage levels of the country. At Beder, as already observed, both Voysey and myself found it on cliffs nearly 200 feet above the general level of the surrounding country.



The boiling point of water at the Sungum was 200.3. Temperature of air at the time of observation 80°.

On the S. bank of the Gutpurba are some low hills running E. S. E. The only one which was examined proved to be a breccia, overlying the light blue and buff limestone, composed of a dark red or liver brown clay, highly indurated, and passing into jasper imbedding angular fragments of the siliceous portions of the subjacent limestone, chert, quartz, &c. The angular fragments of chert are often so small as to give this breccia the appearance of a porphyry, for which some portions of the rock might at first sight be mistaken, and a bed of really aqueous origin confounded with a plutonic rock—an error which has happened.

Proceeding westerly from the limits of the hypogene schists, the imbedded fragments in this breccia become larger, and the conglome-rate character cannot be mistaken. It is evident, from the gradually increasing size of the pebbles, that the rock whence they were derived is neared as we advance west, and that the current which deposited these beds of sand and pebbles must have had an easterly direction.

This inference proved correct; and the limestone was found in sitû at a short distance west from the hills, on the S. bank of the Gutpurba, in broken-up and dislocated strata; some of the limestone slabs had been furrowed as if by the action of pebbles passing along them in an east and west direction. Dark veins of chert projected every where from the water-worn blocks and slabs of this limestone, many of which are thickly encrusted with depositions of a ferruginous kunker which abounds. The limestone often abounds so much in silex, and is so indurated as to give fire with steel, and hardly effervesces with acids, save in a pulverized state. Marks of aqueous abrasion and plutonic disturbance which preceded the formation of the breccia are very apparent in this locality.

Sitadonga hills. A plain almost covered with regur extends from these low hills of breccia to the Sitadonga range, which abutting on and confining the Gutpurba on the north, run down to Badami and Gujunderghur on the south. The hills at this point consist of sand-stone and conglomerates, the latter usually the lowest in position, both partially capped by a lateritic conglomerate which, in many places, has evidently been stripped off by denudation. The conglomerates are

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often of a highly ferruginous and jaspideous character, and imbedding fragments of chert, quartz, and shales from the limestone.

As these hills are ascended, the sandstone gradually loses its conglomerate character, passing into almost all the varieties it is susceptible of, from yellow and reddish rock containing much argillaceous matter, to a loose gritty sandstone with red and yellow bands, which passes into a compact white sandstone, approaching quartz rock, containing specks of oxide of iron, or decayed felspar, in minute cavities.

On the summit of the Pass was a fine whitish sandstone with reddish streaks, composed of grains of quartz held together by whitish decomposed felspar.

On many of the slabs the ripple mark is distinct, running nearly N. and S., which shows that the current must have had an easterly or westerly course in this locality. At the western base of the Pass the coloured argillaceous shales, into which the limestone usually passes near the line of junction with the superimposed limestone, have been invaded and cut by a dyke of basaltic greenstone, and converted into reddish, greenish, and brown coloured jasper and bluish white chert in alternating layers; each line of which presents the original lines of deposition. Two other dykes, or ramifications, are crossed in the plain or valley extending from the base of the first Pass to another range probably a spur or outlier of the ridge just crossed, and though curvilinear, having a general direction nearly parallel with it. Green argillaceous schists, altered by the basaltic dykes, and in almost vertical laminæ, occupy the bottom of the intervening valley. The spur or outlying range is of a compact sandstone capping the schists and dipping at an angle of about 28° towards the S. W. Near the summit of the range it contains a bed of very fine white and red clay which is extensively excavated by the natives, who use the former as a whitewash and to paint the mark of caste on their foreheads.

The Gutpurba finds its way easterly through a break just below this rock, and rushes through the ridge just passed, by a still narrower and more rugged gorge.

Leaving the excavations, the traveller descends the sandstone spur into the extensive and fertile plain of Bagulcotta, based on limestone and its associated coloured shales and schists; bounded on the east by the Sitadonga or Gujunderghur range; and, as far as the eye can



reach, on the west by the ranges west of Kulladghur, and those of Gokauk on the flank of the Western Ghauts.

Plain of Bagulcotta. This plain continues westerly to within a few miles from Kulladghi, watered by the Gutpurba on the north, and bounded by a long, low, flat-topped range, evidently of sandstone; to the S. the limestone, which bases it, has a general dip of about 25° towards the E. N. E. at Bagulcotta, and a direction nearly parallel to that of the sandstone ranges, viz. N. N. W.; both dip and direction, however, vary occasionally, probably from flexures and disturbance by plutonic intrusion. The limestone in the vicinity of Bagulcotta and Kulladghi is of various shades and textures; sometimes as white and crystalline as marble, and composed almost entirely of carbonate of lime; at others siliceous or magnesian, or passing into whitish, green, blue, red and chocolate-coloured argillaceous shales. At Bagulcotta a pale buff coloured limestone occurs, portions of which might be applied to lithographic purposes; specimens of it I believe have been sent to Bombay for trial, but in consequence, probably, of not being selected properly, have been rejected as too hard, or for being veined.

The site I hardly conceive has had a fair trial; by the sending down a person practically qualified to select specimens, and by the quarrying a little deeper than has hitherto been done, I have little doubt that better samples of the stone might be got. Talicotta however, as mentioned in a previous paper, is the most promising locality for lithographic limestone.

The purer white crystalline variety is broken up into small fragments, and burnt into lime. I observed in it the same green chloritic flakes which I afterwards found veining the marble in the quarries of Mount Pentelicus near Athens, and in the Cipolin Marbles. A pale salmon, or flesh-coloured subcrystalline variety, resembling Tiree marble, occurs both near Bagulcotta and at Sullakairy, a village about three miles S. from Kulladghi.

About three miles to the E. of Kulladghi a few low hills of a lateritic conglomerate rest on the limestone and associated shales, running parallel with the sandstone ranges. The cementing substance is partly a calcareous, and partly a clayey paste of a yellowish or reddish colour, imbedding nodules of laterite. The lower portions of this rock are more compact than the upper, and exhibit distinct lines of

Bagulcotta to Kulladghi, consists of sandstone and conglomerate. The latter imbeds pebbles both rounded and angular from the harder and more siliceous portions of the subjacent shales and limestone, and also pebbles of an older sandstone, which I did not discover in sitû; these beds are not inclined so much as the limestones and shales on which they rest, but dip to the same point of the horizon.

Kulladghi. The nullahs in the vicinity of Kulladghi afford good sections of the limestone and its associated shales which, from their highly inclined and bent strata, have evidently suffered much disturbance from plutonic forces. The frequent alternations we see of those rocks, in a very confined area, induces the supposition of the beds having been folded back upon themselves, and thus produced the appearance of a double and reversed alternation, the upper parts of the folded strata having been carried away by denudation, as is seen to be the case on the face of some of the magnificent precipices of the Alps.

The shales are beautifully marked by white, blue, green, yellow, and red coloured bands; and seamed with arenaceous layers. The open seams of the rock are often encrusted with kunkerous infiltrations.

Slate quarries of Katurki. On the Maningpur road near the village of Katurki, about one-half koss from Kulladghi, these slates split into rhomboidal forms by joints, and yield good hones; at Sullakairy tolerable roofing slates, slates and slate pencils are quarried. Sullakairy, as before stated, is about three miles from Kulladghi, on the Gujunderghur road.

The lower beds of the quarried rock at Sullakairy are of a massive blue slate interstratified with a softer lamellar variety, easily fissile, and divisible into leaves which are often not more than a line thick; dendritic markings are frequently seen on the surfaces of the laminæ.

From the more massive beds are hewn large blocks for pillars of pagodas, Hindu idols, &c. Roofing slates are not much patronized by natives, who prefer tiles, thatch or mud, but considerable quantities have been here quarried and sent to the British cantonment of Belgaum and the Portuguese Indian metropolis, Goa. The prices at the quarries, I was informed on the spot, for slates of a foot square and quarter or half an inch thick, are five rupees per hundred slates; they



may be procured however of much larger dimensions, and of any degree of thinness. A capital writing slate and pencil were cut for me out of the quarries, shaped and polished all in a couple of hours.

A loose, friable, dark blue slate in the bed of the nullah near the quarries is sometimes pulverized and ground up with water and used as a blue wash for houses, &c.

Iron Mines of Hirasillaky. Iron ore is procured, according to native information, near the village of Hirasillaky, about two and a half koss from Kulladghi. The metal sells at from two to two and a half rupees the pukka maund of forty-eight seers. Land carriage by bandies or bullocks, and abundance of cheap fuel for smelting are readily procurable.

From want of time and opportunity, my visit to the hone quarries of Katurki was by torch-light, when little was to be made out regarding the thickness or nature of the beds furnishing the Novaculites.

N. direction near the right bank of the Gutpurba, towards the falls of Gokauk, over extensive plains of regur with patches here and there rendered sterile by saline infiltration (the muriate and carbonate of soda,) the limestone and its associated shales are occasionally seen basing the plains intersected by dykes of basaltic greenstone, of which four were counted between Lokapoor and Hulkoond, about twenty-three miles distant from Kulladghi; to the intrusion of these dykes much of the alteration seen in the limestone is attributable.

A little to the west of Hulkoond the great overlying trap of the Deccan is seen to extend over the surface of the schists, and may be traced nearly to the base of the sandstone cliffs to the south and west, covered by sandstone debris; a few scattered sandstone outliers occur between Hulkoond and Kulladghi.

At Munnikerry, about twenty-six miles from Kulladghi, is a ridge of sandstone, approaching a quartz rock in compactness, intersected by a net work of brown, ferruginous veins. The sandstone is, in some situations, covered with a breccia composed principally of sandstone and quartz in angular fragments cemented by a ferruginous clay.



Close to a small pagoda, the sandstone at the S. W. flank of the ridge near the edge of the overlying trap is penetrated with a vein of black manganese, associated with iron, about three inches broad.

At Bugganala, about two and a half miles westerly from this sandstone ridge, the limestone and shales are again seen dipping N. 20° E. direction of strata E. 20° S., layers and veins of a reddish jasper and chert intersect the limestone, a phenomenon that is usually seen where the limestone comes in contact with plutonic or hypogene rocks.

Farther west, between Bettighirry and Ooperhutty, a bed of quartzy talcose schist, approaching protogine, is crossed with layers of lithomarge.

Nearer Ooperhutty, the overlying trap is again seen in low cliffs on the banks of a nullah, resting on a red amygdaloid, which contains layers of a fine red bole with a shining streak, and conchoidal fracture. It does not adhere to the tongue; falls to pieces in water; does not form a plastic clay.

The trap is associated with wacke, with green earth in nests, and a chocolate amygdaloid reticulated with strings of calc spar, and imbedding calcedony and zeolites.

A loose sandstone, associated probably with the laterite, and newer than that which has just been described, rests in horizontal partial layers on the trap, of which it imbeds small fragments.

On approaching the sandstone ranges of Colabanghy and Gokauk, the hypogene schists are seen rising to the surface at their base, and the intervening limestone and its associated shales are wanting. The hill of Punchmi to the S. W. of the town of Gokauk has a base of garnitiferous gneiss, hornblende and chloritic schists, capped with sandstone in massive beds. These beds are interstratified with layers of conglomerate containing rounded and angular fragments of reddish quartz rock, quartz, and a greenish and grey chert. These fragments in many instances appear to have been deposited so tranquilly as to have been arranged agreeably to the laws of gravitation, and occur most frequently at the seams of the thick sandstone beds.

The hypogene rocks have a dip of about 60° towards the E. by N., direction of beds S. 5° E. The sandstone rests on it unconformably,



dipping but slightly in the same direction. A dyke of basaltic greenstone, of about five feet broad, penetrates the hornblende schist in an easterly direction, bifurcates at about the middle of the ascent from the N. E. and is lost in the substance of the rock.

Falls of Gokauk. The subordinate ranges of Gokauk and Cotabanghy now before us, form the eastern flank of the Western Ghauts, and run in a parallel direction, here about S. by E.. At Gokauk the upper portions of this range present mural precipices with either well flat tabular summits, or running in narrow crested ridges.

They are entered from the east by a picturesque gorge (cross valley), through which the Gutpurba hurries from its mountain sources into the elevated plains of the Deccan, near the town of Gokauk, which is about three and a half miles easterly from the falls.

The road lay along the bottom and side of this defile on the right bank of the river, which was now (July) swollen by the monsoon freshes from the Western Ghauts. It varied in breadth from 90 to 300 yards, presenting a rapid muddy stream, brawling and rushing from the alternate confinement and opening out of its rocky channel. It is unfordable generally during four months in the year at Gokauk, viz. from the middle of May to the middle of September, at the cessation of the monsoon. The water at the dry season ford, a little below the town, is now 15 feet deep. The sources are said to be near Bunder or Gunder Ghur, a little N. of the Ramghaut Pass from the S. Concan to Belgaum. After a course of about 100 miles, watering the plains of Kulladghi and Bagulcotta, it finds its way through the gaps in the Sitadonga hills just described, to the Kistnah, which it joins at the Kudli Sungum.

After an hour's time spent in winding up this rugged defile, the falls, the roar of which we distinctly heard during the silence of night at the town of Gokauk, at a sudden angle of the road became partly visible, presenting the magnificent spectacle of a mass of water containing upwards of 16,000 cubic feet precipitated from the tabular surface of the sandstone into a gorge forming the head of the defile, the bottom of which is about 178 feet below the lip of the cataract. The Gutpurba a little above the fall is apparently about 250 yards across, but contracts to 80 as the brink of the chasm is approached; consequently the density and velocity of the watery mass is much increased, and

it hurries down the shelving tables of rock with frightful rapidity to its fall.

The fall over the face of the precipice seems slow and sullen from the velocity of the surface water of this rapid, and from the great denseness of the body; and it plunges heavily down with a deep thundering sound, which we heard during the previous night at our encampment, three and a half miles farther down the river.

This ponderous descent, and the heavy muddy colour of the water, conveys a feeling of weight through the eye to the senses, which is relieved by the lightness and airiness of thin clouds of white vapour and amber-coloured spray which ascend from the basin at the bottom of the gorge in curling wreaths, curtaining the lower portions of the fall, and through which the basin was only seen at intervals when its surface was swept by the fitful gusts that swept up the glen.

Rising above the cliffs that confine the falls, the watery particles vanish as they ascend; but again condensing, descend in gentle showers, which is felt at a short distance round the head of the falls.

Spray bows, varying in brightness, distinctness and extent, according to the quantity of light refracted, and the modification of the vapour, lent their prismatic tints to the ever-ascending wreaths; the largest, (observed about 4 p. m.) formed an arch completely across the river, rose, and receding as the sun sank in the west, gradually disappeared with it. Like the rainbow they are only produced on the surface of the cloud opposed to the sun's rays. The size and distance from each other of the drops composing the different portions of the spray cloud, evidently influenced the brilliancy of the refracted colours, the tints being brightest in those portions where the drops were of medium size and density, and dullest where the watery particles were smallest and closest together.

The velocity of the surface water of the rapid was about nine feet per second, and its depth ten feet. About two and a half miles farther up, the river near the village of Koonoor, beyond the rapid, is a ford in the dry season, and a safe ferry during the monsoon. A tumbler-full of the turbid water deposited 1-50th of its bulk of a fine reddish clay, not calcareous,—a fact showing that the lime which exists in the sediment of this river at its confluence with the Kistnah, must have been derived from the intermediate plains. The pebbles brought down are chiefly



quartz, granitie, and from the hypogene schists, with a few of calcedony; the sands containing grains of magnetic iron. The boiling point of water at the plateau of sandstone from which the cataract falls, gives 2817 feet above the level of the sea.

The mean temperature of the place, approximated by Boussingault's method, is 78°, which I should think rather too high, as the temperature of a spring close by was only 75°. Temperature of air in the shade at time 78°.

The mean temperature of Darwar, which stands much lower, is calculated by Christie at 75°.

The head of the fissure, which is elliptical in form, with mural sides of sandstone, has much the appearance of having been cut back, like Niagara, by the abrading action of the water, for the space of about 100 yards. Large rocks, with angular unworn surfaces, evidently dislodged from the rocks on the spot are seen in the bed, and on the sides of the river below the deep basin-receptacle of the fallen waters and on its margin. The great hardness and compact structure of the sandstone above the falls offers great obstacles to their rapid recession.

The cliffs, however, flanking the right side of the river below, are rent by nearly vertical fissures from summit to base, by one of which I descended to the bed. The direction of two of the largest was about E. S. E. They are crossed nearly at right angles by minor cracks which thus insulate portions of the rock. The bases of these tottering pinnacles are often undermined by the action of the water, and the mass tumbles headlong into the stream.

The sandstone in its lower portions is interstratified with layers of shale, the softness of which facilitates this process of undermining. These shales are of a purplish-brown and yellowish-brown colour, with minute spangles of mica disseminated, and between the laminæ contain incrustations of common alum (sulphate of alumina). The alum is earthy and impure, and sometimes has a mammillated surface resembling the alum incrustations in the ferruginous shales cresting the copper mountain near Bellary. It is found in considerable quantity in a small cave near the foot of the falls.

The ripple mark, so often seen on the sandstones of Europe, is observed in great distinctness on the tabular surfaces of the cliffs and in the exposed layers of the subjacent beds, at least 100 feet below the



which caused them. The ripple marks on the sandstones of Cuddapah and Kurnool have a general similar direction.

At the bottom of the deep fissures in the sandstone cliffs already described, accumulations have formed of fallen fragments of rock, sticks and leaves, &c. from above, intermingled with the dung and bones of bats, rats and wild pigeons, with a few sheep and goat bones. Some of the latter have the appearance of having been gnawed by hyenas, jackals, or other beasts of prey. Many however are evidently the remains of animals that have fallen from above, as the bones are fractured.

The upper portions of these fissures have sometimes been choked by rock and rubbish from above. Their sides, though generally smooth, are marked with shallow polished grooves.

I made two excavations through the floor of the principal fissure, in the hope of meeting with organic remains, but in vain. After penetrating the surface layer of loose stones, and bats' dung, a fine red earth was met with, imbedding angular fragments of sandstone, and a few rounded pebbles of it and quartz. After digging for about four or five feet through this, farther progress was prevented by great blocks of solid rock.

The seeds of creepers and other plants vegetate on this soil, and shoot rapidly towards the surface, shading the fissures with their leaves.

On the cliffs near the falls, on the right bank of the river, stands a small group of Hindu temples dedicated to Siva. The principal shrine is a massive and elaborately carved structure of sandstone, elevated on a high, well built pediment above the reach of the ordinary floods.

Sewen years ago, three of the steps of the northern flight ascending this terrace were submerged by an extraordinary rise of the river. The Vimana of this temple contains the Phallitic emblem of Siva, the Linga, guarded by the sacred bull. Here we passed the heat of the day. On the opposite bank of the river rises a well wooded hill, about 100 feet above the brink of the rapid, on which stand a few ruins of other Hindu religious structures.

Notes on the South Mahratta Country, &c.

The table-land to the S. of the falls is covered with low jungle of Mimosa, Euphorbia, Cassia and Bunder, the Mend bundati with its lilac sweet pea-like blossom, the Carissa spinarum, Webera tetrandra and other thorny shrubs. The Euphorbia antiqua and tortilis were in flower, (July).

Tract between Gokauk and Belgaum, along the Western slope of the Ghauts. From the falls of Gokauk by Padshabpoor to the cantomment of Belgaum, about  $34\frac{1}{2}$  miles, the route lies nearly S. W. across an elevated table-land sloping gently to the eastward, covered with alternating bands of red and black soil, generally well cultivated, and intersected from Padshahpoor, which is about  $11\frac{1}{2}$  miles from the falls, to Belgaum by curvilinear spurs and outlying hills, belonging to the Western Ghaut system, consisting of sandstone and sandstone conglomerates as at Gokauk, in nearly horizontal strata. The ruins of the fort at Padshahpoor stand on a low flat-topped hill of this sandstone. This formation has been covered in two localities by the overlying trap. A little beyond the village of Kunnoor, about two miles from the falls, a narrow coulee of trap is crossed, containing olivine and dark glassy crystals of felspar.

About a mile to the N. E. of Belgaum, another sheet of trap is entered on, which extends to the sandstone ranges on the right. The sandstone is now finally lost sight of on the line of route, and the trap continues the surface rock to Belgaum, where it is covered by a thick bed of laterite, over which is in some places superimposed a layer of the more recent lateritic conglomerate.

Sections of these rocks are afforded by the quarries near the old European Barracks, none of which have been excavated to the subjacent trap. It has however been dug down to in some of the deepest wells of the place. The laterite is used here as at Malacca, Goa, and on the Malabar coast, as a building stone.

The trap in the vicinity of Belgaum rises into hills with rounded summits, covered in general with a dark, spongy mould, which is boggy during the monsoon, the grassy and almost treeless surface of which affords a strong contrast to the jungle-covered hills of sandstone to the N. W. The trap hills are rarely flat-topped, or in horizontal ranges,

as seen in the more central parts of its area. The trap at the summit of these hills is usually dark, compact, and basaltic, but occasionally contains almond-shaped and spheroidal cavities filled with calcedony and crystallized quartz, zeolites and green earth. Black crystals of augite are occasionally seen shooting through its structure, which decay sooner than the imbedding rock; and, falling out in the state of powder, leave numberless cavities on the surface. The rock itself in weathering, resembles iron in rusting, and passes into reddish brown, or coffee-coloured earth, or clay. Cavities occasionally are seen filled with a black earth resembling black bole.

S. E. boundary of the overlying trap at Bangwari. This trap passing into amygdaloid and wacke, and covered with patches of laterite, extends about fourteen and a half miles S. E. from Belgaum, a little to the West of the village of Bangwari, though a few narrow slips are crossed a few miles farther East. The edge of the trap is seen reposing on the hypogene schists at the base of the trap hills close to the village, the ferruginous quartzites with veins of a diaphanous bluish quartz and hornblende schists, are here seen to basset out in nearly vertical strata.

From the Southern limit of the overlying trap at Bangwari to the Malpurba. A few hundred yards to the W. of the village of Hoobly, sixteen and a quarter miles S. E. from Belgaum, there is a low hill covered with alluvial soil, in which I found an angular block of quartz with a fibrous structure resembling that of silicified wood, but evidently not of organic origin. The exterior is brown and opaque;—interior generally translucent with microscopio longitudinal cavities. Minute longitudinal fibres of talc are discoverable with the aid of a lens, having a parallel direction with those of the fibres of quartz, and I have little doubt that the rock owes its fibrous structure to the presence of talc. I have observed a similar structure in the quartzite associated with the talcose and actynolitic schists of Mysore.

Malpurba River. About three-quarters of a mile from Hoobly the Malpurba is crossed. It was swollen by the monsoon (July) and unfordable, having about eighteen feet of water in the main channel. Rate of surface current, two and a half feet per second. Its breadth by a trigonometrical observation ninety-five yards. A tumbler-full of the water



deposited a scanty sediment of fine red silt, about 1-50th part of its bulk. The temperature of the water a foot below the surface was 74°, of air in shade 72°, of a well thirty feet deep 74° 5′. The temperature of rain water 73°. (The atmosphere had then been cooled to 70° and 74° by eighteen days of successive rain, with a pretty steady westerly wind). The banks of the river are of silt and sand, the left or Western bank is steep and high.

From the Malpurba to Darwar. From the banks of the Malpurba to Darwar, a direct distance of twenty-three miles, the country is hilly and picturesque, particularly around the Marhatta forts and towns of Kittoor and Taigoor, which command a lovely landscape of hill and dale. The valleys are generally well watered, cultivated with dry and wet grain, and studded, parklike, with clumps of the Mango and Tamarind, while the sloping sides of the hills, verdant with the rain, afford a plentiful pasture to flocks of sheep and herds of cattle. The landscape around Darwar partakes of the same character, and was frequently brought to recollection during subsequent wanderings in Karamania, the Troad, and other parts of Asia Minor.

The soil covering the surface of this pleasing tract of country, is usually reddish, and the result of the decay and washing of the neighbouring rocks. A few belts of cotton soil appear here and there. The staple products of these soils are rice, yellow and white Juari, Bajra, Raggi, Teimgoni, Till, Tobacco, Saffron, and Maize; Mimosa, Euphorbia, Cacti, Cassias, and Acacias constitute the majority of the wild vegetation.

The schists forming the hills in the vicinity of Kittoor resemble, petrologically, the jaspideous schists of Bellary and Sondur (described in Madras Journal for July 1838, pp. 147-49,) and consist commonly of chert and brown iron ore, or a ferruginous jaspideous clay in alternate layers; sometimes in straight lines, sometimes in flexures contorted, or bent at acute angles, and resembling those of ribbon jasper. This rock, like that of Sondur, is sometimes magnetic with polarity. It contains nests and cavities lined with blistery and stalactitic hematite, quartz crystals, and veins of smoky quartz. In some places, like the Sondur rock, it puts on the appearance of a breccia consisting of a dark chocolate, or liver-brown paste, highly indurated, giving fire with steel, imbedding angular fragments of the striped ribbon jas-

per-like variety, and appearing, as Christie justly describes, as if the latter rock had been broken into a number of small angular fragments, which had been afterwards united by the consolidation of the brown variety. I have seen this singular phenomenon most beautifully exhibited in some specimens of a continental agate breccia in the collection of Mr. Robert Brown, the celebrated botanist, where angular fragments of beautiful jasper and agate are united together in highly transparent quartz. The pieces of agate and jasper must evidently have been once continuous, and re-united on the spot where they were fractured; since, in most instances, the sides of the fractured portions are sharp and angular, and could be refitted into each other with perfect exactness; some are only separated a tenth of an inch by the transparent medium in which they are set. The differently coloured bands identify the fractured portions as having once constituted one integral piece of jasper or agate.

If the reader can imagine a flat piece of ribbon-jasper or agate laid down upon a table, and both broken, so that the fractured portions shall not be scattered widely from their neighbours, and a layer of molten glass carefully poured over them, he may form an idea of the appearance of these beautiful breccias. He must not expect, however, to see such regularity in rocks on the large scale.

Towards Darwar the schists pass into chloritic and argillaceous slates and shales, of all shades of white, yellow, red, brown, and green; interstratified with beds of quartz rock, and the jaspideous rock just described, which generally forms crests and mural ridges on the summits of the hills. The latter is often found in irregular masses, obscurely stratified; but, in most cases, as remarked already, in regularly interstratified beds with the clay and chloritic schists conformable both in dip and direction.

The lustre of this rock is sometimes equal to that of pitchstone, and sometimes dull and earthy; the fracture flat conchoidal, in the more compact varieties; splintery and slightly granular in the less compact. The Kittoor and Darwar schists bear evident marks of the alternation produced by the intrusion of granite, and trap dikes seen occasionally at the bases of these hills; and as in the Ceded Districts, and other localities on the hypogene area, of Southern India, affords striking illustrations of the correctness of McCulloch's remark on the formation



of jasper rock,\* viz. "where strata of quartz rock, containing much felspar or clay occur in contact with granite, they pass into jasper if the clay abounds; while in other places they are converted into chert if less of that earth is present; or, if pure, are rendered perfectly crystalline."

With regard to the classification of jaspideous rocks associated with the metamorphic schists of S. India, it is clear they either belong to the jasper rocks, or silicious schists of McCulloch, both of which, however, I have reason to think, pass occasionally into each other. Both occur in strata among the metamorphic rocks; jasper sometimes forming hills in Siberia and Norway, and it is seen in Scotland and the Appennines imbedded in micaceous and argillaceous schists.

The difficulty that sometimes exists of distinguishing these two rocks has not escaped the notice of McCulloch, who thus remarks: "Jasper presents a few modifications of internal structure which require notice. It sometimes gives indications of a spheroidal concretionary disposition, more or less perfect, and resembling that which, under circumstances of a similar nature, occurs in chert and silicious schist. In the same way, it sometimes possesses a laminar structure, and in this also it approximates to the silicious schists. It is easy to see how from similarity of origin, connexion and composition, it may be thus a matter of doubt to which of those two rocks any given specimen or bed should be referred. The well known striped and spotted jaspers owe their appearance to the two structures above-mentioned, and occasionally the two are combined in the same specimen."

There is however a perhaps somewhat empirical distinction drawn by some geologists between these two classes of rocks, founded upon the supposed less stratified character of jasper, its intrusion into other rocks in the state of veins, and its association with trap rocks, which I will avail myself of to place, pro-tempore, the jaspideous rocks of Southern India among the silicious schists; from their, in general, decidedly stratified character, particularly those of the Southern Marhatta country, which pass into the associated schists, and preserve a conformable dip and direction. The petrographical characters of the Marhatta beds, varying according to the degree of induration, and



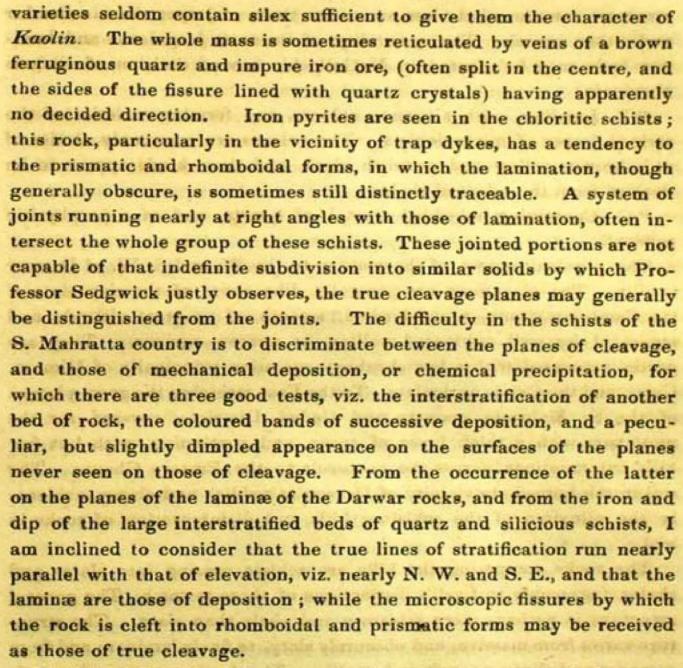
structure, on the whole less assimilate those of jasper than in Sondur and other places. The generality of its most jaspideous and laminar beds may be classed in McCulloch's second division of silicious chert, viz.

"F. Laminar, with alternate colours, and forming varieties of the striped jasper of mineralogists. The colours are commonly shades of red, brown, yellow and purplish black, and these kinds appear to be derived from the coloured shales.

"G. Containing imbedded crystals of quartz, and of a porphyritic aspect."

The physical aspect of the country to the W. and S. W. of Darwar is hilly. The elevations are generally, like those of the clay slate of the Cambrian group, round-backed, smooth, of no great altitude, and separated by well cultivated vallies, or narrow ravines. They are partially covered with a low shrubby vegetation principally of Mimosa, Cacti, and the Cassia auriculata. To the East stretches the great plateau of the S. Mahratta country and Ceded Districts, covered for the most part with a thick layer of regur, and continuing, with but few hilly interruptions, across the peninsula to the Eastern Ghauts. The soil in the immediate vicinity of Darwar is reddish and clayey, evidently the alluvium of the schistose hills, and disintegration of rocks in sitû.

The rocks composing the hills are schists passing into slates and shales, (agreeably to Lyell's distinctions of these terms.) The general structure is perhaps more schistose and shaly than slaty. The structure varies from massive, and obscurely slaty, to finely laminar; and from compact and flinty, to soft and sectile. The laminæ are nearly vertical, and generally run parallel with the prevailing line of elevation, viz. N. W. and S. E. The stratification, if not identical with the lamination, is obscure. It is well known, however, that the lines of fissility in slates are not necessarily those of stratification, the former being often caused by the arrangement of mica, chlorite or talc; petrographically speaking, the rock passes from a green chloritic schist into all shades of white, yellow, red and brown, sometimes singularly arranged in stripes, in contorted and waving bands; red and white being the prevalent tints. Felspar, in a clayey slate of disintegration, is the prevalent mineral blended with quartz, and tinged with iron. The white



My friend Captain Allardyce, who has minutely examined the rocks about Darwar, writes me that the direction of the laminæ and that of stratification keep very constant to one point of the compass, viz. N. W. by N. for a great distance, perhaps over an area of from fifty to one hundred miles. One may pick up a fragment of chlorite slate of a triangular, pyramidal outline, the external planes of which will be ferruginous, while the interior is divided into minute laminæ not ferruginous, and coincident with only one of the planes. On examination of the rock in sitû, this minute lamination is found to be vertical, and invariably divided N. W. by N., conformable, in short, to the line of elevation. The chloritic schist N. of Darwar is of a bluish green tinge,



greasy to the touch; and sometimes so massive in structure as to make an excellent building stone, although it rarely loses its slaty fracture. Thin pieces, per se, before the blow-pipe, fuse partially on the edges into globules of a greenish-coloured enamel.

It is often intersected by ferruginous quartz veins, or rather layers, that, penetrating the lateral joint seams, and the almost vertical layers of stratification, divide the rock into cuboidal masses. Veins of a reddish grey or white kunker, both friable and compact, occur.

Country S. of Darwar to the Mysore and Canara Frontiers. From the hills of Darwar to the Mysore frontier near Bunwassi and Chundergooty, the face of the country presents a plain diversified with a few mammiform and smooth conoidal truncated hills, which do not rise to any considerable height. The soil is generally reddish and alluvial, crossed in an easterly direction by narrow belts of cotton soil. The formation is much the same as at Darwar. Dykes of greenstone and beds of kunker now become more frequent. A large deposit of the latter is crossed on the road between the old town of Hoobly and the German mission house, about fifteen miles S. E. from Darwar. The wells near are often brackish, and so deep as seventy feet. Both Hingari and Mungari crops are cultivated. Rice too is grown in some of the moist, shallow vallies and flats below the small tanks, which now become more numerous.

Bunwassi and Mysore Frontier. Towards Bunwassi quartz rock prevails with greenstone dykes, having a general easterly direction often covered by beds of laterite and lateritic conglomerate imbedding fragments of quartz rock in a cellular brown ferruginous paste. This rock has been employed in the construction of the wall enclosing the quadrangle of the ancient temple and the old temple at Bunwassi. A little farther South rises from the schists the lofty rock of Chundergooty in Mysore, a mountain mass of granitoidal gneiss divided by vertical and almost horizontal fissures.

From Bunwassi to Gudduk. From Bunwassi, E. N. Easterly to Savanoor, the chloritic and coloured schists and slate clays continue. Near the latter place dykes of greenstone become more frequent, accompanied by depositions of kunker, which is seen filling fissures in the schists, and overspreading their surface beneath the alluvial soil. The direction of the beds at Savanoor suffers a deflection after



leaving Darwar of about 40°, being nearly due N. and S., dipping at an angle of about 40° towards the East. They terminate on the N. E. between Savanoor and Gudduck, close to Lackmaisir. Here a spur from the principal N. and S. line of elevation runs nearly E. and W. dipping towards the S.; several similar spurs are crossed between Bunwassi and Lackmaisir; the dykes of greenstone run in a similar direction. The schists, in the vicinity of the dykes, are indurated, silicious, and often abound with iron. Crystals of liver and brass-coloured iron pyrites are scattered through its structure; cotton soil alternates in these strips with the red clayey alluvial soil; it was first observed W. of Bankassur, near which the vegetation peculiar to the W. Ghauts terminates rather abruptly.

At Lackmaisir, gneiss is seen on the bank of a nullah running nearly E. and W. with a dip of 35° towards the S., and farther N. it rises into a low round backed ridge. Proceeding still more N. granite occurs in low bosses and detached blocks, and rises into a few clusters at the town of Kul Mulgoond. Near Hurti, on the S. flank of the Kupputgode range, resting on the gneiss, is a hill of mammiform shape, having its surface covered with detached, angular, and rugged masses of a calcareous rock, which appear to have been subjected to the action of violent disruptive forces. It is very liable to be mistaken, from the colour, hardness and granular texture, for a variety of the massive chlorite schist we have just left behind; and in some hard specimens it resembles diallage and serpentine. The mass of it however, on the application of a lens, clearly exhibits its true aggregate character: it is composed of minute angular fragments of a dark glistening quartz, and crystals of a pale flesh-coloured felspar, cemented by a greenish, granular subcrystalline paste, composed principally of carbonate of lime, and containing disseminated scales of mica. The application of dilute nitric acid to the rock excited but a feeble effervescence; but from the powder, the extraction of carbonic acid gas was abundantly evident. Like the chlorite slate, it imbeds cubical, brass, and liver-coloured iron pyrites. Before the blow pipe, per se, it phosphoresces slightly, and exhibits, on thin edges, shining points of black enamel. The compact varieties of this rock are susceptible of a high polish, and are used for ornamental architecture. Some of the finely polished slabs in the elaborately sculptured mosque in the town Lackmaisir appear to be of this stone, retaining, like lapis lazuli, the pyrites which shine like so many spots of gold in its polished surface. In weathered surfaces of the rock these crystals are often seen projecting. It is not unlike some varieties of the celebrated calcareous breccia di verde of Egypt.

From its massive character, and want of a proper section, I could not find whether it was interstratified with the gneiss, or rested unconformably upon it. Gold-dust is found in the Nalas of Hurti, of Soltoor, and of Chick Mulgoond.

Beyond this singular hill runs a dyke of greenstone E. by S., which is crossed on the road, and also a range of chlorite and clay slate hills crested with ferruginous silicious schist, having a similar direction. Passing this, the country slopes northerly to Gudduck where gneiss and felspar rocks continue.

From Gudduck E. to the Ceded Districts, and N. to Gujunder Ghur. From Gudduck easterly to the Tumbuddra and the Ceded Districts, the formations consist of gneiss, hornblende slate and granite; and from Gudduck westerly to Darwar, first gneiss and hornblende slate; succeeded, about seventy or eighty miles E. of Darwar, by chlorite and coloured schists and shales. North of Gudduck the hypogene schists and granite extend to Gujunder Ghur, where they are covered by the sandstone beds.

Kupputgode Hills. The Kupputgode range presents an example of one of the crop dislocations which traverse the table-land of the peninsula in a direction from, E. by S. to E. S. E. often influencing the courses of the large rivers which, rising in the Western Ghauts, flow over the table-lands through gaps in the Eastern Ghauts to the Bay of Bengal. It commences a little south of Gudduck, and proceeds in a curvilinear direction easterly, until a little W. of the village of Kuddumpore where it bifurcates; the principal branch taking a S. 25° E. direction to the Toombuddra, which flows through a wide gap, and is continued into the Ceded Districts by Harponhully. The northern branch pursues an easterly course towards Dummul, where it traverses a wide plain extending as far as the eye can reach to he N. E. The strata dip near Gudduck towards the N. at an angle of 35°. Those of the southern chain, below the bifurcation and change in the direction,

dip E. 20° N. direction of strata S. 20° E. The dip frequently varies with the flexures and contortions into which the hypogene schists have been thrown. In one of the highest peaks it appeared quâ quâ versal; and near the temple to Kupput Iswara, whence the range derives its name, I found the dip to the S. W.

An immense dyke of basaltic greenstone emerges from the base of the strata near the point where the range suddenly bifurcates, accompanied, as usual, by large deposits of *Kunker*, which fill most of the seams and fissures in it and the adjacent rock. Considerable tendency to silicification is observed; the schists are profusely veined with quartz of different hues, white, pinkish, and diaphanous blue, reddish, smoky and black; seams and large veins of basanite also occur.

The Kupput hills are principally composed of hornblende and chloritic schists, gneiss and mica slate; large interstratified beds of silicious and ferruginous schists, as at Darwar, often forming thin ridges; seams and thin beds of a crystalline white marble occur; which, near their junction with the hornblende slate, are often coloured green. On the flanks of the range, at the base, gneiss invaded by granite is seen, both quartzose and felspathic, containing rose-coloured quartz and felspar. Near Dummul the gneiss is often so much weathered as to resemble sandstone; schorl and actynolite are usually seen in the quartz veins, which intersect it. The dip of the gneiss is nearly vertical at Dummul, in other situations it varies almost to horizontal; some of the hills are capped with laterite, resembling that of Sondoor. The beds of the Dhoni rivulet, which has its rise in these hills, contain gravel and sand, in which gold-dust is found associated with magnetic iron sand, menaccanite, iron ore, grains of platinum, grey carbonate of silver, grey carbonate of copper, &c. Manganese is also found in considerable quantities. Tippoo excavated pits for gun-flints, of which I have given a description elsewhere. Potstone occurs with the talc schist in this vicinity, and is used by the natives in sculpture, for cooking vessels, and for giving a smooth surface. The occurrence of gold, silver, copper, platinum, and manganese seems to have escaped the observation of Christie, Marshall, and other writers on the

<sup>\*</sup> Madras Journal of Literature and Science for January 1840, p. 42.



S. Mahratta country; and there doubtless exist many other minerals in its rocks now unknown, but which the researches of other and abler pioneers than myself, and with more leisure, will not fail to elicit.

Geographical position and extent of the various Rocks of the S. Mahratta Country.

Hypogene Rocks. Commencing on the South, we find the greater portion of our area occupied by hypogene schists and argillaceous shales and slates, reaching on the North from Gujunder Ghur from the edges of the limestone and sandstone tracts; and at Bangwari, fifteen miles S. E. from Belgaum, basseting from beneath the overlying trap whence they extend by Darwar and Kittoor, forming the base of the Western Ghauts, and underlying the laterite of North Canara to the Sea on the West, stretching into Mysore on the South, and into the great plains of the Ceded Districts and Hydrabad on the East.

Near the N. W. angle they are seen outcropping from the sandstones near Gokauk as a salbande at the edges of the overlying trap formation along the N. bank of the Kistnah, in narrow zones along the Western base of the Sitadonga hills. They are seen with granitic rocks on the summit of the Ramghaut, and below it hornblende schist occurs on the sea shore at Vingorla.

## Extent of the Limestone and Sandstone Beds.

The Limestone. The Southern boundary of the limestone and its associated shales has not been traced with accuracy, but we find it four or five miles S. of Kulladghi.

On the North Eastern extremity it emerges from the overlying trap near Talicotta, is capped by sandstone at Mudibhal, but re-appears in the valley of the Kistnah at Chimlaghi. A little to the S. W. it is again overlain by the great mass of sandstone forming the Sitadonga hills, but again is seen forming for the most part the base of the great plains of Kulladghi and Bagulcotta, and stretching to the West to the sandstone ranges of Gokauk and Padshapoor which bound it to the West, while the northern edge is fringed irregularly along the banks of the Gutpurba by the overlying trap.

Extent of the Sandstone. The sandstone and conglomerate ranges usually skirt the great limestone plains as the sand and gravel shores



environ the bed of some dried-up inland sea, and this appearance is heightened by the bold, flat-topped headlands and receding bays presented by the sandstone ranges in their curvilinear outline. This continuity of these long horizontal ranges, which usually preserve an uniformity of height, rarely exceeding 300 feet, has however been greatly violated by, apparently, denudatory aqueous causes; and it is not uncommon to see outlying masses and short ranges of sandstone at considerable distances from the principal deposit, for instance the detached rocks of Noulgoond, Pedda and Chick Nurgoond, (where it occurs in scarped masses cropping granite and the hypogene schists,) and the detached central range between Kulladghi and Gokauk.

The Sitadonga hills form the eastern fringe to the district, and those of Gokauk the western, extending southerly from its northern limits on both sides of the limestone plain of Kulladghi and Bagulcotta to about the latitude of the Malpurba river. The subjacent limestone thins out, or is entirely wanting at the edges, where the sandstone is often seen resting immediately on the granite and hypogene schists. The eastern ridge of sandstone turns westerly near Gujunder Ghur.

Extent of the Laterite. Laterite is seen capping some of the sandstone hills of the Sitadonga range, and a narrow belt along its eastern flank. It also occurs in the form of low hills and patches overlying the limestone in the plains of Bagulcotta and Kulladghi.

In the Southern parts of the district it occurs in a few patches covering the hypogene schists of the Kupputgode range, and on the summits of the Ghaut ranges West of Belgaum and Darwar.

Extent of Kunker. Kunker is pretty generally distributed; there are beds near Badami and Hoobly, of some extent, covered by alluvium.

Extent of the Regur. This remarkable soil, or deposit, for so I consider it, resembles much the Tchornoi Zem covering the steppes of Russia; it prevails almost exclusively in the plains East of Darwar, and those of Kulladghi and Bagulcotta, except where interrupted by chains of hills, and covered by the alluvium washed from their sides, in beds from a few inches to thirty or forty feet deep.

Extent of Plutonic and Trappean Rocks. Plutonic rocks are rarely seen developed in any extent on the surface of the South Mahratta country, but their effects are sufficiently apparent in the altered state of many of the lower rocks.

Granite is seen in bosses and rocks near Lackmaisir, at Gujunder Ghur and Noulgoond, underlying the sandstone at Mulgoond, in the gneiss of the Kupputgode hills, at Gudduk and Dummul, and in the districts bordering on the Tumbuddra and East of Gujunder Ghur.

The largest dykes of basaltic greenstone, which I observed, were at the West base of the Sitadonga hills, and in the Kupputgode range.

Extent, &c. of Overlying Trap. The southern margin of the great sheet of overlying trap, which overspreads almost the whole of Central and Western India and the Concan, runs across the northern part of the South Mahratta country, covering all rocks except the laterite, kunker, and regur, all which overlie it: entering from the Nizam's territories by Firozabad on the Bhima, it descends to the Kistnah near Churilaghi, near its confluence with the Gutpurba and follows with some irregularities the northern bank of the latter river by Kotabangy, a little to the N. of the falls of Gokauk to the W. Ghauts and the sea, which it reaches a little N. of Malwan.

The narrow zone of oliviniferous trap, crossed between the falls and Koonoor, possibly connects the outlier of this rock on which Belgaum stands with the main Coulee.

North of the Kistnah the trap spreads over the Kolapoor, Sattarah, and Poonah countries; to the N. E. it covers the plains of Bijapore and the Nizam's territories, stretching towards Gwalior. Where the trap terminates to the W. of Belgaum is not exactly ascertained, as the summits of the Ghauts near the Pass down to Vingorla are composed of granite and the hypogene schists; but the river Gutpurba, as has been observed already, brings down a few calcedonies to the falls of Gokauk. The amygdaloid noticed at Bangwari, and in the vicinity of Belgaum, appears to have escaped the observation of Christie, who states he has not seen this rock in sitû.

Classification of the Rocks of the South Mahratta Country.

Christie, partly adopting the Wernerian system, has classed the rocks of the South Mahratta Country under five heads, viz.:

1st. Granite.

2nd. Transition Rocks.

3rd. Old Red Sandstone.

4th. Secondary Trap.

5th. Alluvial.

Under the head of Transition he has included the gneiss and talc schist of Dammul, Nurgoond and Gairsuppa. The chlorite and clay slates, silicious schists and quartzite of Darwar, Kittore, and in short, the schists of the whole of the central and southern parts of the Darwar districts, together with the limestone of Kulladghi and Bagulcotta.

Some clay slates associated with these limestones he has classed among the grauwacke group, and the sandstone with the old red sandstone.

This classification has been apparently grounded on mineral resemblance of the schists to the transition rocks of Werner, their in general highly inclined strata, and on the circumstance of the sandstone resting, in some localities, on the schists in unconformable, and almost horizontal stratification. These facts, without the additional evidence of organic remains, and in the total absence of any associated stratum the age of which has been distinctly ascertained, would hardly be deemed by geologists of the present day, sufficiently conclusive to warrant the rocks of the S. Mahratta country being referred to the same epochs as the transition, grauwacke and old red sandstone rocks of Europe, as now defined.

Werner, in his improvement of the system of Lehman who divided rocks into three classes, viz. :

1st. Primitive: comprising plutonic or granitic rocks, and the hypogene or metamorphic schists formed with the world, and containing no fragments of other rocks;

2nd. Secondary: including the aqueous and fossiliferous strata which . resulted from the partial debris of the primitive rocks by a general revolution;

3rd. Alluvial: comprehending the debris of local floods and of the Deluge of Noah-

intercalated a 4th class between the 1st and 2nd class, and under this head he placed a series of strata, which he thought formed a passage between Lehman's primitive and secondary rocks, hence called transition, assimilating on the one hand to the crystalline structure of mica, and clay slates, and on the other, evincing traces of a mechanical origin, and organic remains. These beds were chiefly of clay slate arenaceous rock, coralline and shelly limestone, and grauwacke, a grey argillaceous sandstone, often schistose, imbedding small fragments of quartz, flinty slate, or basanite, and clay slate, cemented together

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by argillaceous matter. Werner, in the confined space that fell under his observation, found both the primitive and transition schists highly inclined, while the newer aqueous or secondary beds were horizontal: hence his too hasty generalizations. It is now ascertained that secondary strata and green tertiary beds are often found in nearly vertical position, and that some granites are newer than the lias and chalk; on the other hand, gueiss is often seen in horizontal beds, and Mr. Murchison has lately discovered in Russia the older stratified rocks extending in horizontal unbroken masses for the distance of nearly one thousand The value of mineral character unsupported by others, is of small value as a test of the relative ages of stratified rocks; we see lacustrine strata of the Eocene period identical in all their mineral characters with the secondary new-red sandstone and its associated marls, and certain arenaceous beds in the cretaceous formations of the Alps, and even in some tertiary deposits, which can hardly be petrologically distinguished from the rocks of the grauwacke group.

Although it is quite possible that future discoveries may prove the sandstone to be equivalent to the old red, and many of the rocks, classed as transition, really to belong to that period? yet I consider it preferable, for the present, to arrange the rocks of the S. Mahratta country agreeably to the acknowledged geological evidence they themselves exhibit, in addition to that of a mineral character, viz: superposition, imbedded fragments of older rocks, intrusion with or without alteration, conformable or non-conformable stratification, and this with little reference to European formations. The classification will therefore, for the most part, be that of relative age. Not a single organic remain, I may observe, has hitherto been discovered in the most recent deposit in the S. Mahratta country to assist us to any conclusion, except recent terrestrial and fresh-water shells in the newer kunker.

The stratified rocks will be classed in the ascending order, commencing with the hypogene, or lowest series. The plutonic and trappean rocks will succeed.

Age of Hypogene Rocks. The hypogene schists are evidently the lowest in the group of normal rocks, and have suffered the greatest disturbance as already observed. The lowest member in this series is usually gneiss, and the highest either marble or clay slate: but there are many exceptions to this remark.

Age of Limestone. Christie has classed with the hypogene schists under transition, the limestones of Kulladghi and Bagulcotta; but from extensive observation of this rock, here and in other parts of India, I am inclined to think it, with its associated slates and shales, of more recent origin, principally from its resting on the gneiss, &c. in usually unconformable stratification, often dipping but a few degrees over large tracts, and its more intimate association with the sandstone which caps it; these rocks being usually seen together. The limestone is inclined near Kulladghi at an angle of 25°, but this disturbance is confined to areas of small extent, speedily recovering its usual little inclined position. In some localities, as near Ryelcherro and Juldroogum in the Ceded Districts, it is seen to alternate with the sandstone. Traces of coal have been discovered in a limestone in the Hydrabad country, which appears identical with the Kurnool and Kulladghi limestones.

Sandstone. The sandstone, though sometimes alternating, and often in conformable strata, with the limestone, is on the whole less disturbed, as just observed; and generally appears in almost horizontal strata, particularly in the hills south of the Malpurba. On the north bank of this river the sandstone beds have suffered more disturbance, and Christie observed them dipping at an angle of 40° to the N. W. at Chick Nurgoond, resting on vertical hypogene schists, (talc slate). In the N. E. portion of the district the sandstone of the Sitadonga hills rests on vertical chlorite and silicious schists, with a dip towards the N. E. varying from 5° to 28°. In the N. W. portion, near Gokauk, the stratification is obscure, the beds appearing as thick and nearly horizontal tabular masses. Where the strata are horizontal, the hills which they compose run in long, low, flat-topped, wall-like ridges terminating like trap elevations rather abruptly, and their sides often presenting mural precipices. These ranges usually run in corresponding elevations, averaging about 200 feet from the surface of the plain. The maximum thickness of the deposit perhaps does not exceed 400 feet.

From their being sometimes in unconformable stratification with the limestone, and imbedding fragments of its cherts, it might be inferred that an interval of plutonic disturbance took place between the periods of their deposition; though we have not as yet sufficient evidence to refer them to two distinct geological epochs. Basanite,

quartz, hornblende, actynolite, and other of the hardest fragments of the hypogene and granitic rocks are occasionally seen in the sandstone. but rarely pieces of gneiss or of the granite mass itself, -a circumstance indicating great trituration of its components prior to consolidation. With regard to mineral character, the limestones and sandstones of the S. Mahratta country resemble those of the Devonian groupe perhaps more than any other, but it has been already remarked what little reliance is to be placed on this test of the age when unsupported by other evidence; more particularly as organic remains have been discovered in the sandstones of Hydrabad and Nagpore, supposed to be identical with those of the S. Mahratta country, which would indicate a more recent era. These fossils are a hollow compressed body, of a deep black colour and compact structure, the centre of which is filled with sandstone, and supposed to be a vegetable by Mr. Malcolmson, who discovered it in the sandstone bill of Won. The others from the sandstone in the vicinity of Nagpore were discovered by Lieutenant Munro, H. M. 36th, and are impressions of plants which resemble the Glossopteris Danœoides of the Burdwan coal field, as figured by Royle. With these plants impressions were found, which Mr. Malcolmson conceives to be not unlike those of the large bony scales of the sauroid fish of the carboniferous and old red sandstone rocks, especially those of the latter. Mr. Malcolmson showed me these specimens at Bombay, and I agree with him that these last impressions were too imperfect to justify any opinion as to their real nature. As he justly remarks, in a subject so new, and I may add as likely to afford so important a key to the classification of the rocks of India with those of Europe, no indication should be overlooked. The occurrence of a Glossopteris in strata imbedding organic remains of the Devonian groupe, would be novel and interesting.

I am not aware that the diamond, a marked mineral characteristic of the sandstones of the Ceded Districts occurs in the Eastern Ghauts from the Pennaur to north of the Kistnah, and which as far as a peculiar mineral characteristic can perhaps identify rocks, identifies it with the diamond sandstones of Nagpore, in which the fossils alluded to as discovered by Mr. Munro occur, and those of Punnah in Bundlecund, has hitherto been discovered in the sandstone of the S. Mahratta country. A bed of anthracite three feet broad and 200 feet long, has

lately been discovered in the sandstone of the Goond country, and traces of it exist in the sandstone N. W. of Nagpore.

Laterite. Next in order of superposition to the sandstone comes the overlying trap; but adopting the arrangement of Lyell, I shall place it and the granitic rocks apart from those that have a confessedly bedded structure.

Laterite was classed both by Voysey and Christie with the overlying trap; by the former as a volcanic rock. Christie has not given an opinion as to its origin. It has been thought of volcanic origin, principally from its apparently unstratified and non-fossiliferous character, and being frequently associated with trap rocks. It however occasionally possesses a distinctly stratified and conglomerate character, and passes into a loose coarse sandstone, as at Pondicherry, imbedding silicified wood, and at Beypoor, on the Malabar Coast it passes into a loose sandstone imbedding layers of lignite. General Cullen was the first to discover lignite and carbonized seeds in the laterite of Quilon and Travancore. He now writes me, that he has discovered extensive beds of lignite in the laterite formation of these provinces.

Some geologists suppose it is the result of the weathering still in progress of granitic and trap rocks in sitû. The fact of its imbedding rolled fragments of sandstone when resting on granite, and the beds of lignite and silicified wood it contains, militate strongly against this theory: and independently of these facts, nothing is more common in lateritic tracts than to see a hill of trap or of hornblende, gneiss or other hypogene schists capped with a thick bed of laterite, while the adjacent hill, composed of an exactly similar rock, and equally exposed to the action of the weather, is quite bare of laterite. I have examined beds of laterite resting on trap and amygdaloid imbedding calcedonies and jasper, but have not hitherto detected in the former any fragments of these tough silicious minerals, which are found to resist successfully even the attrition of the most rapid streams of India, long after the imbedding trap has disappeared and been lost in alluvial sands, and carried across the Peninsula into the bed of the ocean.

Their occurrence, however, particularly at the point of contact, would not prove that the laterite was formed from the upper portions of the subjacent trap weathered in sitû. A detrital and mechanical origin like that of the sandstone, would carry into it the harder un-

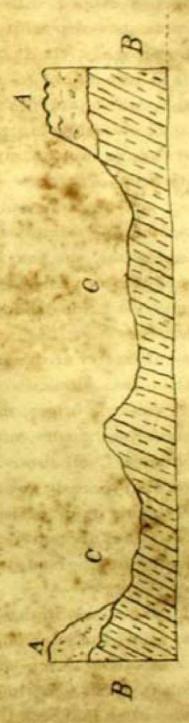
weathered nodules of the rocks from which it was derived. I have also seen laterite resting on limestone without a traceable particle of lime in its composition. This could not have been limestone weathered in sitû.

The fact of one hill being capped with laterite, and its neighbour being left bare, is a circumstance also militating against another theory adopted by some Indian geologists, viz. that of its alluvial origin from causes now existing. It is impossible to see the laterite capping in tabular strata, as at Beder, hills of trappean or hypogene rocks separated by vallies, wide plains or elevations, in which nothing but the latter rocks are seen, without coming to the conclusion that the beds of laterite were once continuous over these spaces, and stripped off by waters of which nothing but the trace of denudation now remains. Natural sections often remind one forcibly of that striking instance of denudation of the red sandstone, on the N. W. coast of Ross-shire given by McCulloch in his Western Isles, Vol. II. p. 93, pl. 31, fig. 4.

The annexed diagram is a section taken on the W. coast, between Honawer and Sedashegur.

The rarely fossiliferous character of this iron clay or ferruginous clay, as it has been called, which has puzzled some geologists, and inclined others to the theory of its volcanic origin, may be in some measure attributed to its highly ferriferous nature, often approaching that of an ore of iron. It is a fact, and, as Lyell observes, (Geol. Vol. II. p. 102,) one not yet accounted for, that scarcely any fossil remains are preserved in stratified rocks in which this oxide of iron (derived from the disintegration of hornblende or mica) abounds; and when we find fossils in the new or old red sandstone in England, it is in the grey and usually calcareous beds that they occur.

I have often observed, particularly in the W. Ghauts, and on the Malabar and Concan coasts, where the rains fall heaviest, that the granitic, hypogene and trappean rocks containing most iron, weather into ferruginous and coloured clays that sometimes, lithologically speaking, resemble laterite, and these when that rock is near, cause the appearance of their passing into it. I have also observed beds of considerable magnitude of an impure oxide of iron in gneiss and hornblende, sometimes cellular and pisiform (and from which much of the iron in laterite has doubtless been derived); but when we look up from the microscopic view afforded by these slowly weathering blocks of rock and beds of ore in sitû,



Section shewing denudation of Laterite between Honawer and Sedas highur. Captain Newbold and cast our eyes upon even the present extent of laterite over the surface of Southern India, the thickness of its beds (at Beder 200 feet,) its flat-topped ranges of hills, the great gaps effected in their continuity evidently by aqueous causes no longer in action, its often elevated position above the drainage of the country, its imbedding layers of lignite from silicified wood, and occasionally water-worn pebbles of distant rocks, we find we can no more attribute its origin to the weathering of rocks in sitû, or to their present transported detritus, than that of the old sandstones of Europe to the sandy disintegration now in progress of accumulating by rains around the bases of older sandstone, granite, and hypogene rocks, although a mineral resemblance exists as in the case of the true and pseudo-laterites.

Having said thus much to warrant my placing laterite among the rocks of aqueous and mechanical origin, I shall proceed to notice it as it occurs in the South Mahratta country. It may be remarked, passim, that fossil shells have been scarcely ever found in the tertiary Rhenish brown coal beds, though in the vicinity of Bonn large blocks have been met with of a white opaque chert, containing numerous casts of fresh-water shells, which appear to belong to Planorbis rotundatus and Limnea longiscata. The laterite capping the overlying trap of the South Mahratta country does not appear to have been invaded or altered by it like the brown coal beds. But similar blocks of chert containing fresh-water shells, viz. two species of Cypris, three of Unio, and many individuals referable to the genera Paludina, Physa and Limnea, and also Gyrogonites, have been discovered by Mr. Malcolmson and myself entangled in it.

Near Kulladghi, where it reposes on the limestone, it exhibits undoubted signs of horizontal stratification. It is never seen altered by the granite or trap. West of Kulladghi, near Ooperhutty, beds of a gritty sandstone loosely agglutinated, resembling that into which the laterite passes near Beypoor on the Malabar Coast, rest in a similarly horizontal and unaltered position on the overlying trap; fragments of which occur in this superimposed sandstone.

Kunker, Gravel, and Regur. That singular deposit, for so I consider the Regur, is superimposed on all the rocks that I have just de-



scribed. There is frequently an intervening bed of gravel or of the older kunker, in which the remains of a mastodon have been discovered, near Hingoli, Nizam's country. I have not met with gravel beds in the South Mahratta country. The diamond is found in the gravel beds below the Regur in the Cuddapah district. My ideas regarding the origin of those deposits have been elsewhere stated.

Age of the Plutonic and Trappean Rocks.—Granite. From the rarity of sections, it is difficult to ascertain the relative age of the granite by the tests usually resorted to by geologists in fixing the ages of plutonic rock, viz.:

1st. Intrusion and alteration.
2nd. Included fragments.

3rd. Relative position. 4th. Mineral character.

Christie evidently views the granite of the South Mahratta country as primitive, according to the Wernerian theory; but states that there is a granite at Gairsuppa, in Canara, "not so old as the common granite of India," which, from mineral character and association with the gneiss and other hypogene rocks, he classes with them, in the transition series of this school. But within the last half century it has been ascertained that this granite, considered formerly as the oldest of rocks, sometimes belongs even to the tertiary period, and its presence at Gairsuppa, and in the southern portions of the South Mahratta country, intruding into, disturbing and altering as it does, these crystalline schists, plainly proves its posterior origin.

But there is no proof adduced of any other granite of India being anterior to the granite of Gairsuppa, and there is every reason to believe that the granite of Gairsuppa and the Western Ghauts must rank among the oldest granites of India, until the age of the rocks they have altered and intruded into be satisfactorily proved to be posterior to the other hypogene rocks that prevail so extensively over its surface.

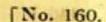
There is, moreover, a granite more modern than the common granite of the Western Ghauts, Gairsuppa, and indeed of India, which is seen to penetrate the latter in veins and dykes, a fact proving its posterior origin,—and which, although it has not hitherto been discovered in the state of dykes in the sandstone and limestone, has converted the former into quartz rock, and the shales of the latter into jasper and chert, indicating a posterior or contemporaneous origin.

The disturbance and metamorphic effects produced by the eruption of this granite do not appear to extend to any great distance from the foci of plutonic disturbance. The sandstone ranges in the S. Mahratta country are usually little inclined, particularly in the ranges S. of the Malpurba, resting unconformably on the hypogene schists and granite, in highly inclined stratification; but travelling a short distance north we find them showing more signs of plutonic disturbance, and, according to Christie, the sandstone of Chick Nurgoond is uplifted at an angle of 40° resting on the vertical hypogene schists; a fact indicating two eras of plutonic disturbance.

It is a striking fact that no fragments of undoubted granite or gneiss have been noticed in the pebbles of these sandstone conglomerates, which consist chiefly of quartz, chert, jasper, basalt, flinty slate, and the hard portions of the chloritic and actynolitic schists, the two last rocks bearing a small per centage in relation to the rest, and those of quartz greatly predominating in the lower beds. The inference is, either that the attrition which converted the wreck of the pre-existing rocks into sand and gravel was so great, as to grind down their mass beyond the possibility of recognition, leaving nothing but fragments of their hardest nodules and veins, or that the oldest granite was still undenuded, and with the gneiss at this era was as yet but partially uplifted and retained its natural subordinate position.

It is certain however from the included pebbles of the flinty slate, jasper, actynolited and chloritic schists, that the plutonic action of granite had commenced prior to the origin of the sandstone, and had metamorphosed or crystallized the hypogene, or rather formed schists of the wreck of which the sandstone is formed.

If this reasoning be admitted, it is obvious that at least two epochs of great plutonic activity have taken place. The first anterior to the formation of the limestone and sandstone, by which the hypogene schists were rendered crystalline and partially subverted. The second, posterior; and marked by another granitic eruption, which burst up through fissures in the old granite, altering the limestone and sand-



stone. From the latter occasionally resting on the former in less disturbed strata it may be inferred, that the limestone suffered some degree of dislocation before the sandstone was deposited. There is little doubt from the unaltered and highly inclined stratification of some of the beds resting on the granite, that it must have been protruded by this second upheaval in a solid form. Other highly inclined beds are altered, which indicates a heated but solid state of the intruding rocks.

The third movement or series of movements by which perhaps a great part of S. India was slowly and gently lifted up to its present elevation, raising beds of laterite in a horizontal position to the height of 7,000 feet and upwards, appears to have taken place during the tertiary period. This great soulvement is perhaps rather attributable to volcanic than plutonic action, since the granites of both eras appear to have been raised in a solid form, and no granite of India has yet been observed altering or intruding into tertiary rock. Possibly its phenomena were connected with those attending and following the grandest eruption of trap in the whole world, the overlying trap of Western and Central India, which evidently took place in the tertiary period.

During these epochs, it is almost needless to say, that the surface must have undergone various oscillations at different periods, during which the aqueous strata were deposited, consolidated, and partially denuded, uplifted and submerged.

Age of Basaltic greenstone. Like the granite the basaltic greenstone is evidently of two eruptive epochs, as we see dykes of it crossed by more recent dykes.

The greenstone of the first epoch is posterior to the older granite and hypogene rocks which it penetrates, and with which it has been uplifted in a solid form; partaking of all their dislocations and abrupt truncations. This older greenstone stops short of the sandstone; the conglomerates of the latter imbed pebbles of the greenstone.

The newer basaltic greenstone penetrates, and alters the limestone and sandstone, but stops short of the laterite. Both rocks are distinguished mineralogically from the tertiary or overlying traps by their rarely assuming an amygdaloidal character, and their freedom from agates, opals, calcedonies, zeolites, green earth, olivine, &c., so abundant in the latter.



Age of the overlying Trap. It overlies and penetrates the sandstone and newer basaltic greenstone, and from its altering and disturbing the fresh-water limestones of Nirmul, and its superior position to all the rocks of the S. Mahratta country except the laterite, kunker, and regur, is referred to the tertiary epoch. It is strikingly mineralogically distinguished from the older trap rocks, as just explained.

The order of superposition of the rocks of the S. Mahratta country in descending order appears to be as follows:—

Regur,
Old kunker,
Laterite,
Lateritic sandstone,
Overlying trap,

Basaltic greenstone,
Granite,
Sandstone,
Basaltic greenstone,
Granite,
Hypogene schists,

} 3rd group.

Comparison of these groups with classified European groups. There can be little doubt of the rocks of the 1st group belonging to the tertiary period, after what has been remarked regarding the age of the overlying trap on which they are superimposed. The remains of the Mastodon have been found, with other fossils pointing to the Pleiocene division of the tertiary epoch, in the gravel and kunker below the regur, near Hingoli, in the Nizam's territories. No fossils have been yet found in the regur; but its position, extent, thickness, and the impossibility of accounting for it by causes now existing, warrant me perhaps in referring it to an epoch anterior to the post-Pleiocene or historic period.

2nd Group. No sufficient data for fixing exactly the age of these rocks. The presence of coal and other mineral and fossil indications point to the Devonian or carboniferous groups.

3rd Group. The clue to the approximate age of these rocks will be found in properly fixing those of the second; a point of great impor-

tance in the geology of India, and to which I would fain call the attention and endeavours of all geological observers to fix, by searching for fossils, &c. If the rocks of the second group belong to the Devonian series, the hypogene schists must be either the rocks of the Silurian or Cumbrian series, as their unconformable stratification points out a greater age than the less disturbed and superimposed beds of limestone and sandstone. We need not even despair of finding fossils in gneiss, chlorite, and mica slates of India, since that illustrious geologist Elie de Beaumont displayed to the wondering eyes of the Savans of Europe the instructive fact of belemnites, (a fossil of the chalk period,) in chlorite schist.

An Account of the early Ghiljáees. By Major R. Lerch, C. B., late Political Agent, Torán Ghiljáees at Kálát-i-Ghiljáee. From the Political Secretariat of the Government of India.

[The character of part of this paper is somewhat of a lighter order than usually appears in our pages: but our readers will at once understand the motives which have led us most readily to avail ourselves of it, almost as written. The traditions of the Ghilzaees recorded by Major Leech, give a valuable insight into the manners and habits, the social condition and the ordinary train of thoughts, of a race of men very little known. The acute observation of the writer of the memoir has let no point escape him which may illustrate the real character of the curious tribe whom he describes; and the student in ethnography will, we are convinced, be thankful for the exposition of social peculiarities thus afforded to him.—Eds.]

The following account has been compiled from notes taken partly when Political Agent at Candahar in 1839-40, and partly while in political superintendence of the expedition under Colonel Chambers against the Toran Ghiljaees in 1841, and while Political Agent at Kálát-i-Ghiljáee in 1841-42, (during the siege,) and partly from a written

account drawn up at my request by Mulla Pairo Lodeen, who staid with me throughout the siege.

The Ghiljaces, as will be shewn, are only Afghans by the mother's side, being by the father's descended from the Sultans of Ghor.

The word is properly Ghalzo'e: from ghal, thief; and zo'e, son—meaning the son of theft, the fruit of a clandestine amour. The Ghiljaees themselves give this derivation of the word, although they would appear to be ashamed of it by turning Ghalzo'e into Ghiljaee. The Persians have out of compliment turned it for them into Ghilzye.

On the 28th August 1841, while making a tour through the, till then, unvisited Ghiljaee tribes of the Arghandah valley, a Rokhee Mulla of some reputed sanctity and respect in the tribes, said they were all Ghiljaees, as the Persians pronounced the word Ghiljyes as the Afghans and themselves did, from being descended from Ghilj the son of king Bet.

In my journal kept during the siege, I find the following memorandum, dated 22nd April 1842.

"May not the word Ghilzye be derived from Ghalech. (The Persian vowel mark zer having in Afghanee the pronunciation of a in hare); and Ghalech being often written for Kilech: and the tribe may have been called Ghalechees, or descendants of Ghalech. An acquaintance, a great grandson of Ashraf-khan, is named Ghalechkan."

A mistake has very generally been committed by supposing the termination zye or zai to the names of Afghan tribes to be derived from the Persian word for to be born. The word is a corruption of the Pushtoo zo'e a son, and a true Afghan of the sarah or country would tell you he was a Popalzo'e or Babakanzo'e as the case might be; a Popalite or Babakanite; and he would not say he was a Popalzye or Babakanzye, on pain of being abused as a spai zaman (comes filius) Parseeban.

It is related that the Caliph Abdul Malik, son of Marwan, despatched his commander-in-chief Hujaj, son of Yoosaf, a Sakufee by tribe, to subdue Ghoristan. It was then under two princes, Shah Jalaladeen and Shah Muazzadeen, sons of Sultan Bahram who had the country given him in grant by Alee, the cousin of Mahammad, on a visit he paid

the Hazrat at Medina. The great grandfather of Sultan Bahram was Soosee, alias Mahammad Sam Ghoree, who first introduced Islamism into Hindustan. It was he that built the fort of Sealkot, and that killed Raja Pathoora.

The Sultans of Ghor were descended from Zohauk, nephew of Ibas, son of Esam, son of Sam, son of Noah, who expelled Jamsheed from Persia.

Shah Husein, the son of Shah Muazzadeen, emigrated on the invasion to the country of Shaikh Batanee, between Cabool and Candahar, by whom he was received into his family. Batanee had a daughter, with whom the tradition runs; Shaikh Husein formed a connection, unknown to the parents, until their daughter's appearance betrayed her.

The Ghiljaees still preserve this time-honored custom, judging from several cases that came under my notice, the most prominent of which occurred at Kalat-i-Ghilzye. A young unmarried lady of the aristocratic Shah Alam Khel branch of Rokhee Ghiljaee, was safely delivered of a son and heir, the father of which, her intended, was no less than a holy Sayad of Pishing, then absent in India. It appears that they were engaged, and at liberty therefore to have their Namzat-bazee; but as the Sayad had not paid up the whole of the marriage settlement by some 100 rupees, the parents would not allow him to take her home. He therefore resorted to this Ghiljaee mode of cheapening his bargain. I met him afterwards in India, but did not enquire whether his lady was yet with her parents or with his own.

It is very probable that the Afghans, if they were really Israelites, should have been posted by their Cabtu Bukhtanasar on the confines of his dominions towards India. We find Sultan Shahabudeen bringing down the Afghans from Ghor and posting them on the borders of India, and this system of colonizing an unquiet border with convicts seems to have been much in vogue. Thus we find the tribe of Hazarahs far from their present country, posted in the plains of the Punjab below Cashmeer. A colony of Persians was planted in Cabool, and one of Ghiljaees in Balkh. And between the Ghiljaees and Duranees on the Candahar road, we find ten solitary houses of Hazarahs, so called by the Afghans, at Asya Hazarah; no doubt a larger colony was once posted there to keep the peace between those two rival tribes.

I find from my journal, that on the 28th September 1844, I sent for their chief men to gain information. They informed me they were originally Uzbecks from Turkistan, and are by tribe Sadlechees. They have the water of the canal called Bokanah. They furnished six men and one officer to the Duranees, and were enrolled among the Baneezais.

But to return to the lovers. On Shaikh Batanee and his wife discovering the state of their daughter's affections and person, they became most anxious to have the couple married; but family pride was in the way, and they were anxious first to know concerning the syal or rank in society of their guest. He was therefore questioned, and gave himself out as a prince born, and invited them to ascertain the fact by despatching some one to Ghor, his native country. This was done, and a confirmation of Husein's affirmation attained in time, it is to be hoped, to allow the babe to enter without shame into the world. Husein is said also to have married the messenger's daughter, in consideration of his taking the trouble of going all the way to Ghor; others say, that on his return he refused to confirm Husein's assertion until he had promised to marry' his daughter also. This is probable, and according to the character of an Afghan Cossid, getting a promise made before imparting good news.

The Ghiljaees say, that Sultan Mahmood of Ghuznee first brought them down from the Koki-kase or Koki-roh, and they began to dig Karez, (vide the Karez of the Sulemanees near Ghuznee). Malcolm (I think) says they were nearly exterminated by that monarch, as a punishment for a party of them having plundered his baggage, and that they only regained strength in the time of Timoor.

The first person of note known to the present inhabitants was Sultan Malakhe, a Tokhee.

It is probable that Mahammad the progenitor of the Mahammad-zye Tokhees, and Isaac the progenitor of the Isak-zye Hotakees were both

<sup>\*</sup> Note.—We have to apologise for omitting a brief, and apparently carefully compiled list of the genealogies of the Ghilzye families. It would be of interest were circumstances such as to place any of our readers in immediate communication with this tribe; but, as it is, we may be perhaps excused omitting it.—Eds.

men of note in their day, from these tribes being considered the aristrocratic ones.

I saw a Rakam of Aurangzeb, dated the 9th of Jamadee'l-awal, 1022 A. H., appointing Malik Malakhe to the charge of the high road from Kalat to Karatoo, (the former is in the Tamak valley, and the latter in the Arghandah,) to protect it from Hazarah robbers. Aurangzeb no doubt found Malakhe the most powerful of the Ghilzye chiefs at enmity with the Hazarahs; as patronizing an officer of his own creation at court, he no doubt found very different from supporting a newly created chief over his tribe.

The Hotakees I suppose from being removed from the high road were not required by Aurangzeb, and therefore remained unnoticed; that monarch's sole object being to secure his communication with Ghuznee, Cabool and Hindustan, and not coveting revenue from their Karazees, and almond orchards.

The Hazarahs are sid to have been driven out of the Arghandah valley in four days.\* Malakhe is said on this short campaign to have received valuable co-operation from the Khan-khel chief Mane, whose descendant I find from my journal visited me on the 13th August 1841.

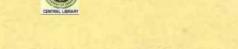
Khuram says he is the son of Taj Mahammad, the son of Avqhan, the son of Khajah, the son of Mane, the son of Taoos, the son of Daroo, the son of Habeeb, the son of Khan, the son of Parwat, the son of Barak by his wife Khatah, the son of Mahammad, the son of Yoonus, the son of Rahmand, the son of Tokh, the son of Baroo, the son of Tolad, the son of Ghiljye. I have mentioned the descendants of Malakhe in a former part of this account.

At the time that Malakhe was chief of the whole Toran tribe, (both Hotakees and Tokhees,) Jabbar it is said was chief of the Ibrahim Ghiljyes.

The Peer-khanah, or spiritual fatherhood of Malakhe were the Sodeen (Ala-udeen properly) Sayads.

Malakhe had a daughter, by name Nazo; who was one day playing below Kalat-i-Ghiljye with girls of her own age, on the banks of the

<sup>\*</sup> This might have been effected by Aurangzeb's troops, had they known of the existence of the Passes discovered by me in 1841. That from Kalat-i-Ghiljaee to Surkh Sang (No. 1, Appendix,) and the other from Chasmah-i-Moosaka, via Cheeno into Karatoo, (No. 3, Appendix.)



river Tarnak, when a Fakeer, appearing to be from Hindustan, approached the party, and said, "What good girl among you will give me a kiss?" Some ran away, others hid their faces, and some abused him; but Nazo, throwing back her veil, and approaching, said, "Oh Fakeer, a kiss of my face is at your service."

The Fakeer, to the surprise of all, instead of availing himself of the offer, stroked her head with a fatherly hand, and said, "I have prayed to God to give you three or four children; one of whom shall be a king, (Hajee Meer-khan, alias Meer Wais)."

The father of Meer Wais (a Sodeen is the informant,) was in the employ of Malakhe, whose daughter Nazo falling in love with him, (true daughter of Ghalzo'e,) an elopement to the Ataghar hills, occupied by the Hotaks, was the result; who, however, for fear of Malakhe's wrath, refused them refuge; and they had to spend their honey-moon in the desert hills, living principally on game.

Getting tired of this, Nazo proposed to her husband that they should go "Nanawat" (as supplicants) to her father, who was of a forgiving disposition.

Having no other resource this plan was adopted, and with success. Malakhe received them kindly, as well as some Hotakees who accompanied them. When giving them leave, Malakhe asked his daughter what she would have, a chadar or veil; it being the Afghan custom that the first time a daughter visits her father after her marriage, he gives her a veil. She replied, "The Hotaks have no land (on the Tarnak river), kindly give me a piece of land."

Malakhe gave her a piece of land below the Tabaksar hill, opposite to Kalat, watered by and dependent on the Ajurghak canal; and to the groom who led the horse she rode, he gave the land dependent on the spring of the Jukhtaran hill close by. This Jillodar was a Kishyanee by tribe. Others say, that Nazo got ten days and nights water right on the canal, and her groom two. These shares are now (1841) distinct.

Malakhe was killed in battle at Darwazye, between Inzargai and Surkh Sang, and was buried at Ab-i-Yazee.

The father of Meer Wais is called by the Hotaks Shah Alam. The Tokhees contradict them, and say they only were called Shah Alamkhels after their progenitor married a Shah Alam Tokhee's daughter.



This is absurd; for by the Tokhee's own shewing, Shah Alam was the son of Alee Malakhe's brother, so that Nazo was not a Shah Alamkhel.

Jabbar, the Ibrahim chief, was killed at Yayas in battle with the Safees, and buried on the road between Cabool and Jalalabad. The place where his tomb is situated is famous for cold, wolves, and thieves, on which account some Persian traveller has cursed the tomb. In the course of time, Nazo gave birth to Hajee Meer-khan, alias Meer Wais, the same who liberated his country from the Persian rule, and his countrymen from the tyranny of Shahnawaz-khan, the Georgian governor of Candahar.

The reasons for Meer Wais visiting Persia are found in Malcolm's Persia, and more in detail in the Chronicles of a Traveller. The Ghiljyes believe that while at Mecca he demanded a sign from heaven, that he should free his country from a foreign yoke. It was given him. On awaking, his sword was found lying bare at some distance from the scabbard in which he had secured it before going to sleep.

It was Shahnawaz's penchant for wine and women, that lost the country for the Persians be it remembered, and he was a Faringee.

Beyond the village of Chahil Dukhtaran on the road to Chahil Zeena, there is a slippery rock called Ang-i-Sakhshak, down which the children of Candahar on Fridays and other holidays slide. This was one of the scenes of Shahnawaz's debaucheries.

The place at which he met his well-merited death was at Belai-Sultan Khudadad in Argasthan—he was following or despatching 300
horse across the Band-i-gil,\* on the road to Maroof, to collect revenue
from the Kakers. He was not thought worthy to be killed by the hand
of a man; so Murado, a Babce cunuch and jester, was ordered to kill
him in full durbar the day after his seizure. The following Pushtoo
Badala is still extant:

" Sháhnawáza bujul báza, Da Murado da lás parotiya kuna wáza."

\* I find from a memorandum in my journal in November 1839, that the road from Candahar to Deh-i-Ambar was occupied by Popalzais, and that I proposed to make the following arrangements for the protection of the road beyond Deh-i-Ambar, viz:—On the Candahar side of the Tagak Pass near some wells, a small fort to be built and eight horsemen to be stationed; on the other side of the Tagak Pass, at a place called Hou-



Shahnawaz the bujul-baz, (player with the knuckles of legs of mutton, i. e. a light fellow of low habits.)

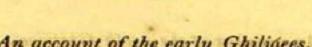
By the hand of Murado (there) you lie exposed.

Shah Ashraf was, the Ghiljaees say, killed by his cousin Shah Husen of Candahar, (i. e. by his orders,) on his arrival at Koh-i-Mundak. Some deny that Ashraf murdered Mahmood, believing that he died mad.

The wars of Mahmood, and his cousin and successor Ashraf in Persia, are detailed in the Chronicles of a Traveller. The following two anecdotes are still told strangers visiting Candahar, connected with the invasions of Persia: one is, that many of the Ghiljaees who accompanied Mahmood on his expedition to Persia were mounted on bullocks, with their ragged kosaks or felt cloaks on, and their sheep's skin of flour strapped to their backs, and an old iron hatchet or a sword in a broken scabbard their only arms, just as if they were going to the water-mill at the bottom of their native village to bring home flour. This will be easily believed by officers who have been in Afghanistan, and have seen after an engagement bodies of men with nothing but sticks in their hands. When the city of Ispahan was taken, it is said that Shah Mahmood gave his followers leave to take possession of the house that each might enter, with every thing in it, even the widow of its owner who fell fighting, for his home. That one of the handsomest palaces of Ispahan thus fell to the lot of such a "Ghool-i-Biyaban" as I have above described; who entered it in his above full dress, leading his bullock after him into a splendid saloon covered with rich carpets, at the end of which was seated he lady of the mansion surrounded by her damsels; and backwards and forwards over the carpets these two animals walked, the one looking for some thing to which he could tie his fellow.

The lady of the mansion ordered her handmaids to do all they could to please the visitor; to take his bullock into the stable, and divest him of his boots of sandals and tattered woollen cloak, and take him to the bath.

This they had some difficulty in doing, as he would not consent at first that his bullock, sandals or cloak should be taken out of his sight, they being his only ones; and each article was surrendered after a little dakai, a fort and six horsemen; on the Candahar side of the Gill Pass at a water-mill, a fort and eight horsemen; on the other side of ditto, six horsemen; at Jaknaree and Shamai, a fort and eight horsemen. The whole under Abdul Lateef-khan, Barikzai, of Maroof.



struggle, accompanied with Pushtoo abuse; the handmaids setting his mind at ease in Persian, of which he did not understand a word, and by signs. He was finally taken to the bath, and never had the attendant barbers operated on such a subject before, the cracks in his huge feet and hands being like ravines of his native hills. After cleansing him as much as possible, and shaving his hedge hog-looking head of hair, he was attired in trousers and shirt of red twilled cotton, the richest under garments a man must wear, and other suitable parts of dress; and conducted back into the saloon, where a rich entertainment was laid out, at which the lady of the mansion presided.

The Afghan finding himself more at home, determined to make the most of his good fortune, and act the part of the master of the house.

Observing that the trousers of the lady were of gold stuff, while his were of common red, he insisted on an exchange; and in them went he next morning, proud of his appearance, to Mahmood's darbar, where his appearance putting his illustrious tribesmen to shame, he got nothing but a sound beating.

The second anecdote was told me on the scene of its occurrence, the Achakzai hills, on the 23rd May 1838, while ascending the Kojak Pass. An Achakzai who had accompanied Shah Mahmood on his expedition to Persia, had married a rich lady of Ispahan. In the midst of the rich repasts she provided for him, and the beautiful garden of a hundred fountains and thousand parterres that he found himself master of, he would sigh (between a grunt, a groan and a growl,) "Oh! for my country of the thousand-holed cakes, and alas! for its Makhai gardens."

The lady, fancying rightly that the country that could surpass the capital of Persia in its luxuries, must be heaven itself, determined to return with her new husband to Afghanistan. Whatever might have been her misgivings on the road, seeing that as they advanced the fertility of the country decreased, her despair was at its height on arriving at home-a khel or encampment of ghijdee, (black hair tent) in one of the wildest parts of the Achakzai hills. But her heart broke when she found that the thousand-holed bread was made of the vetch called gal, which becomes honey-combed in baking (food that her slaves would reject in Persia,) and that the Makhai gardens were nothing

An account of the early Ghiljáces. but the stony hills covered with the thorn, known by that name in

Pushtoo. It was such uncivilized acts as the above, no doubt, that made the Persians stigmatize the Afghans with the following:

> Oughán i khar, Tobra ba sar: Bákalee ba khar, Dingla ba zan:

Which the Afghans retort in the clumsy "Tuguogue" of Parseeban,

Da khira kurbán.

Leaving the period of the Ghiljye (not Afghan) wars in Persia to the above-mentioned authorities, I return to the seat of the tribes.

On Hajee Meer-khan (who seems to have set the fashion of performing the Haj to Mecca, as we find many Hajees among the chiefs both Afghans and Ghiljyes about his time,) gaining possession of Candahar, he called on the Tokhees to pay him revenue for their lands, and furnish him with recruits for his wars, as they had not assisted him in the late struggle. In reply, they asked how they could be expected to give up rights that they had acquired with so much trouble, and after so many battles.

The chiefs of the Tokhees at this time were Shah Alam, the son of Alee, the brother of Malakhe, and the son of Shah Alam, Khushalkhan, and they would not acknowledge the supremacy of the Hotakees; war therefore broke out between the tribes, and the Tokhees were obliged at last to quit the Tarnak valley and take refuge, that is, to retire to the Arghandah.\* Others formed into two Toraks or gatherings. The Shah Husen-khel, and other tribes about Ab-i-Tazee had their gathering at Yakhav, and the Peerak-khels and other tribes around them had their gathering at Omakai-kalat, at this time was held by the Tokhees under Hajee Edil, the son of Malakhe, to whom are attributed some supernatural powers.

He had a son called Bayai, a very brave and daring man; who built a small fort on the river Tarnak, a little way from Kalat up the road; and the Hotakees had a fort on the other side of the river at Jukhtaran, the Hotak gathering being at Choudai.

<sup>\*</sup> I found in 1841, that a threat to burn the crops they had left standing, and to fill in their karez (irrigation tunnels,) brought them back to the Tarnak, (month of July.)



Although Bayai had 100 men in his fort, he always went out alone on his expeditions, which were directed against the opposite Hotak fort. It was his habit at dawn to attack the people of the fort as soon as they came out, and he sometimes brought three and four heads, and no one dared to meet him hand to hand; at last the drinking-water of the Hotaks became bitter, (i. e. they were hard prest) and they laid in ambush for him one morning; and, hamstringing his horse first, succeeded in killing him. On the death of Bayai, Kalat was taken possession of by the Hotaks, and now Mahammad-khan, alias Hajee Angoo, the son of Yaya, and nephew of Meer Wais, became governor.

About this time the report of Nadir Shah's marching on Candahar reached the country, and the Hotakees assembled and came to the decision that they had a new and powerful enemy in front, (Nadir Shah) and an old one in their rear (the Tokhees,) and that it was prudent to get rid of the enemy in the rear, and then meet the enemy in front; therefore they collected their whole tribe, besides procuring 4,000 horse from Candahar and from Puli Sangee, made a sudden attack on the Peerakkhel Tarakut Umakai, which might be said to be empty, as the chiefs Ashraf-khan and Allaiyar-khan, sons of Khushal, were absent on the Arghandah to collect troops. The whole Torak was massacred, women with child not being spared. On Ashraf-khan and Allaiyar-khan hearing of this disaster, they took the most solemn oath an Afghan can, viz., Zan-talak, that they would not spend a night at home before they had revenged themselves on the Hotakees. Zan-talak is divorcement of a wife.

Proceeding viâ Mezan and Teereen, they joined Nadir Shah's camp at Cheenaran, and tendered their allegiance. That monarch appointed Allai-yar-khan his deputy at Ispahan, and was led by Ashraf-khan to Candahar, (Herat being taken after a siege,) which place it is said held out for fourteen months. The heroic defence of the burj or tower of Mulla Alee, a Ghiljye, after the fall of Candahar, deserves to be recorded. The ruins of it are incredibly small in extent.

When Nadir was besieging Candahar, Abdul Ghafoor was governor of Kalat-i-Ghiljye; he with Abdul Rasool, were sons of Hajee Angoo, by a Peerak-khel Tokhee mother. Abdul Rusool had gone to Sarobai of the Kharotees, to collect the Ghiljyes of that neighbourhood to raise the siege of Candahar. Nadir heard of it, and made a Chapao on the levies at



Shibar, of whom he made a great slaughter. Here Jan Tarakee came in; Nadir then returned to Candahar, leaving 4,000 men to besiege Kalat; when it fell, Jan Tarakee was left in command.

Moosa-khan, father of Maddut-khan Isakzai Duranee, (surnamed Dongee) conducted the Chapao on Shibar. The grave of Jan Tarakee is on the top of Kalat, over the spring close to that of the Fakeer. He had such power over the tribe as to have left the proverb behind him of

#### " Wak da Khuda dai da Jan Tarakee."

"It rests with (or depends on) God;" and Jan Tarakee, one of the present Tarakee chiefs, Arzhegee, (1st July 1841,) is the son of Ala Verdee, the son of Suleman, the son of Jan, the son of Meer-khan, the son of Kasam, the son of Doulat, the son of Madoo, the son of Peroz, the son of Nassoo, the son of Mummye, the son of Ahmed, the son of Tarak.

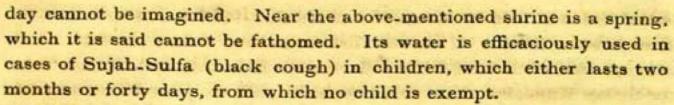
Nadir Shah conferred on Ashraf-khan the chiefship of all the Ghurghushtees, and avenged him on the Hotaks by leading away captive 1,500 of their families to Hindustan, Turkistan and Persia.

During the first part of the reign of Ahmed Shah, Ashraf-khan was governor of both Kalat and Ghuznee, and he accompanied the Shah on his first campaign to Hindustan. On his return the Duranee chiefs persuaded the Shah, that Ashraf-khan was far too powerful for a subject. He with his son Haleem-khan were therefore invited to Candahar and thrown into prison, and their seals were made use of to entice Allai-yar from Ispahan, the Shah proposing to share his conquests with him.

Allaiyar-khan on his arrival was also thrown into prison, and nothing is known how these three met their fate; the wall of their prison by some is said to have fallen on them.

Although the above belongs to the history of Ahmed Shah, I mention it, as of course his historian would neglect to do so.

I met in the Ghiljye country, which I had failed to do at Candahar, traces of Zamroot Shah of Candahar, on the 23rd August 1841. At Dab-i-Pighai, not far from the shrine of Taroo Nika, on the brink of the hill, the remains of a small fort are pointed out. Here it is said that Zamroot Shah banished a mistress, by name Lolee, to employ herself in agriculture and gardening, and that in her ignorance she planted parched wheat. A more beautiful view than from this position on a fine

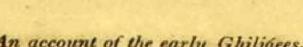


I have mentioned before, that the Khaleels and Momands held the country before the Hazarahs. I remember one day on the Arghandah asking a Tokhee chief, what a stone and mud pillar on a neighbouring eminence was for? It was built, said he, long before our time; it is some boundary mark of the Khaleels and Momands. In my journal under date 22nd January 1842, I find the following memorandum:

Shekh Mate-khaleel had (the Khalak people say) four sons and one daughter; Shah-i-Mardan, Kalat, Garmam, Hasan, and a daughter Jukhtaran, who all on being buried sent forth springs of water from their respective graves of the same quality, which retains its temperature during winter, (it may then be seen running smoking down the hill.) The graves are all in the neighbourhood;—Jukhtaran, a small mound east of Kalat, just across the Tarnak Hasan-i-Mate, above the village of Khalak; Garmam, (they deny the word being Garmah) west of Kalat; and Shah-i-Mardan, south of Kalat, a small flat-topped hill like the one over Khalak called Tabaksar. They say that Shah-i-Mardan outlived his brothers and sister, and boasted that as they had made streams of water, he on his death would make a river. On account of this vanity and presumption, the stream from his grave is the smallest of all, only supplying drinking water.

In Dara's translation of Nyamatullah's history of the Afghans, Part II, page 19, Chapter XX., Shekh Mati-khaleel is mentioned as chief of twelve Sarbanni clans. Hasan-i-Mate lived, we may suppose, in the time of Zeerak, the great grandson of Abdul, and in the time of Nahmand the great grandson of Ghiljye, and the fort of Kalat was of course never fortified before the spring on the top of the hill burst out; and it may be assumed, that it was first fortified by some royal hand, as the surrounding tribes would never have allowed one branch to occupy such a commanding position.

I never succeeded in satisfactorily ascertaining whether Shah-i-Safa or Kalat was the oldest. The former is said to have got its name from some sick monarch, who then experienced "Shafa" (recovery) from his disease. I have heard it called by some the capital of the country once



called Bakhtar; and by others, that of Zameen-i-Khawar, who is said to have been a brother of Dawar, (Zamundawar). I have no doubt Aurangzeb fortified Kalat-i-Ghiljye for Sultan Malakhe, and Shah-i-Safa for Sultan Khudakye, if he found them dilapidated. Sher-khan, we find from the account of the early Abdalees, brother of Sultan Khudakye, commanded at Shah-i-Safa on the part of the king of Delhi.

I had almost forgot to mention, that the Moosa-khel Tokhees are divided into Buran-khels, Nazar-khels and Khwaidad-khels; and that the latter are divided into Shakee-khels and Mamee-khels.

Although the account of the early Ghilzyes ought to end here, I cannot forego giving an abstract translation of Mulla Pairo's whole account.

Mahammad Ameen-khan, the son of Ashruf, and Rahmatullah-khan the son of Allaiyar, on hearing of the fate of their fathers fled to the Suleman-khel country to Zarmut and Kalawaz. Azam-khan, the son of Ashruf, and some other children were led captive from Kalat to Zameen-dawar. From this place effecting their escape, they fled to the Persian court, and from it received the countries of Khukees and Nermasher. Ahmed Shah conferred the chiefship of the Tokhees and Kalat on Soorkai-khan Babakarzai, who was shortly after murdered by the Mahammad-zai Takhees.

Soorkai-khan had two sons, Sayud Rahmat-khan and Lashkareekhan; the former accompanied the Shah on his campaigns, and the latter was stationed at Kalat.

On the 26th August 1841, I saw a descendant of his, Khaleel-khan, son of Rahmat, son of Hajee Munsoor, son of Usman Ghanee, (called Surkai Sultan by Nadir, and Khoja-khan by Ahmed Shah), son of Joga, son of Meer Hazar, son of Taooz, son of Kasum, son of Utman, son of Suleman, son of Babakar, son of Shamal, son of Yoonus, son of Rahmand, son of Tokh, son of Baroo, son of Tolad, son of Ghiliye.

Sometime after the accession of Timoor Shah, Mahammad Ameerkhan was invited from the Suleman-khel by that monarch, and made chief of Kalat and of the Tokhees and Hazarahs; and on Timoor Shah marching from Candahar to Cabool, Mahammad Ameen (Amo) Khan paid his respects with 100 Suleman-khel swars at Pali Sangee, and received a dress of honor, and other marks of the royal favor: at the same



time Noorulla-khan, son of Hajee Angoo, was created chief of the Hotakees, with the flattering title of Ikhlas Kulee-khan, and the revenue of the countries of Dera Ismail-khan, Daman, Banoo and Urgoon. He was on his death succeeded by his son, Abdu Raheem-khan.

On Azad-khan declaring independence in Cashmeer, Amo-khan was at Herat, from which place the Shah sent for him and despatched him with Sardar Maddut-khan Duranee at the head of a force to that province. In the battle that was fought with Azad-khan, Amo-khan was shot by some one of his own party at the back of the head, the ball coming out at one of his eyes: his corps was brought to Kalat to be buried. He left three sons, Nealee Nyamut-khan, Futteh-khan and Meer Alam-khan.

On the accession of Zaman Shah, Walee Mahammad-khan (with the title of Walee Nyamut-khan) succeeded his father, being very young, and Moladad-khan Moosa-khel was his naib, or deputy.

On Shahabudeen-khan, the son of Ramatullah-khan, coming into notice, a feud broke out in the tribe of Tokhees. The rise of Shahabudeen is thus accounted for. The Ameen-ul-mulk was by tribe a Babee, and having once in darbar spoken rather sharply to Walee Nyamut-khan, the latter foolishly allowed himself to retort with an old Pushtoo proverb. From that day Shahabudeen was taken by the hand, the Ameen-ul-mulk supplying him from his own private funds. The tribe arranged themselves in two parties, and Kalat was sometimes in the possession of one, and sometimes in that of the other. In one of the many skirmishes that took place, Moladad-khan, the Tokhee deputy was killed.

On one occasion some horses of Shah Zaman's coming with a caravan from Cabool, were plundered by some Tokhee robbers of the clan of Koortah-khel. Immediately on hearing of it, Walee Nyamat-khan with a few of his Yassawals pursued them. The robbers took to the hills, and Walee Nyamat-khan was killed by them while storming them. His corpse was conveyed to Kalat, and buried with his father's.

Fatteh-khan soon after avenged his brother's death, by decapitating several of the robbers, and making the rest take refuge in India; he hung up the heads below Kalat.

Shahabudeen-khan and Fatteh-khan were engaged in their quarrels until the war between the Ghilzyes and Duranees broke out, which occurred in the following manner.



Shah Mahmood from Candahar had made one march beyond Kalat, and Shah Zaman from Cabool had arrived at Aghojan; his chief Sardar Ahmed-khan Noorzye being with the advanced guard one stage ahead, (at Tazu) his defection from which place to Mahmood Shah caused the overthrow of Zaman Shah's power.

This pad-shah gardush, or revolution among the Durances, occurring in the heart of the Ghilzye country, suggested to that tribe the present as a favourable opportunity to declare their independence, and make an attempt to establish a Ghilzye kingdom.

Abdu Raheem-khan Hotakee was declared king, and Shahabudeen his Vazeer; his hearty co-operation being secured by the former giving him his daughter Sahab Jan, (with whom when in her father's house he had been in love,) the wife of the defeated Shah Zaman, and mother of the princes Nasar, Kaisar and Mansoor, with all her jewels, and handsome carpets, and numerous cooking utensils. Shahabudeen-khan was left to stop communication on the high roads, and Abdu Raheem-khan went towards Cabool to raise the Suleman-khel. Troops were detached from Cabool, and the Ghilzyes were defeated; the Ibrahim Ghilzyes losing 5 or 6,000 men. Abdu Raheem-khan retired on Kalat; and a Durance force having marched from Candahar, the Ghilzyes left their strong position on the hill to meet them, (Fatteh-khan had already gone over to the Duranees). The battle was fought between Jaldak and Umakai on the ridge called in Persian "Tappah-i-Surkh," and in Pushtoo "Sirah Ghah." The Ghilzyes were defeated; the Tokhees losing 7 or 800 men. The Hotakees being chiefly horsemen, escaped comparatively unscathed. Winter put an end to further hostilities. This year 1802 A. D., is still remembered by the Ghilzyes as the Sal-i-Katul, or year of massacre. The chiefs on the Ghiljye side were Abdu Raheem-khan Hotakee and Shahabudeen-khan Tokhee; those on the Duranee side were Abdul Majud-khan Barik-zai, Saidal-khan Alako-zai, Azam-khan Popal-zai, Shadee-khan Achak-zai, (Arzbegee) and Samandar-khan Bame-zai.

In the ensuing spring Ahmed-khan Noorzye marched with a force from Cabool. On his arrival at Hulan Rabak, the Jalal-zai Tokhees under Mulla Zafran, a grandson of Malakhi, opposed him; but were defeated with a loss of 600 men. Ahmed-khan continued his march to Candahar, and brought out a large Duranee force with guns and shaheens. This time the Tokhees under Shahabudeen-khan and Fatteh-khan, kept to



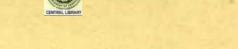
the hill of Kalat, out of which very strong position every attempt of the Duranees to dislodge them failed, with loss of men.

The Duranees failing at Kalat, determined to carry away the Ghiljye families which had been left for security on the Arghandah; and they boasted of this intention, calling to the Ghiljyes on the hill to ask Dara-khan if he had any message to send by them to his women and children. After the Duranees had started for the Arghandah, Dara-khan taking his swars by a short road arrived at the Tarak or encampment, in time enough, during the night to throw up a sangar or entrenchment of loose stones.

The Duranee detachment arrived in the morning, and were thrice repulsed from the sangar; but being disciplined troops, they were not easily to be defeated. At this time some of the occupants of the sangar who were not fighting for their honor (wives,) left the sangar and fled. The Duranees under cover of their laden ponies and mules, made another attack, which proved successful, and eight members of one family were cut down on the one carpet on which they were sitting. The Duranees lost 100 men.

This was the last battle between the Duranees, Tokhees and Hotakees. After this Abdu Raheem-khan and Shahabudeen-khan retired to the Mammye hills. Shahzadah Shuja-ul-Mulk had also taken refuge in the Kaker country, where he organized a powerful faction, which Shahabudeen-khan and Fatteh-khan Babakar-zai joined, as did Shakar-ulla-khan, the son of Abdu Raheem-khan Hotakee. On Shuja-ul-Mulk becoming Shah, Fatteh-khan and Shakarulla-khan attended on him; but Shahabudeen-khan never did as long as he lived, for which the Shah never forgave him; and hearing of his having built a fort in Nawak, Gulistan-khan Achak-zai, governor of Peshawar, was despatched to destroy it; Fatteh-khan Babakar-zai accompanying him. On entering the district of Nawak, so secure was the Achak-zai chief that Shahabudeen-khan would shut himself up in his fort, that he accepted Fatteh-khan's invitation to dinner at his place, Jameeyat.

Shahabudeen-khan getting intelligence of this, sallied out with his cavalry and fell upon the Durances as they were carelessly straggling on to their stage, and routed the cavalry, killed the artillery men, burnt the gun carriages, and spiked the guns. which remained there all the winter. Next spring Sohbat-khan Popal-zai, being detached from Cabool



with a force, recovered and mounted the guns, and made use of them for several days without effect against the fort walls, which remained entire until destroyed by British Sappers in the autumn of 1839.

Shahabudeen-khan and Fatteh-khan for a long time were played off against each other by the tribe, and the enmity existing between them was considerably increased by Shahabudeen-khan's brother Meer Mahammad (whose praises as a bold soldier are still sung,) being killed by Fatteh-khan, in the district of Khakah. This enmity continued unabated until the death of Fatteh-khan, and the two rival chiefs had generally two or three fights every season, (harvest.) On the death of Fatteh-khan, Shahabudeen-khan made the usual mourning visit to his son, (the present) Samad-khan, and this long-standing quarrel was then made up.

Samad-khan married a daughter of his, giving a daughter in return to his grandson, Mansoor-khan.

This brings the Toran Ghiljye history down to a tolerable modern period, and nothing remains to be noticed, but a few particulars regarding the forces furnished to the Duranee kings by the Ghiljyes.

The Andadees furnished 600 horse as did the Tarakees in the following proportion.

Babadeen-khels 120, Sak-khels 120, Peroz-khels 60, Tsoil-khels 60, Gurbuz-khels 120, and Na-khels 120.

The Hotakees furnished 500 as did the Shamal-zais, including the Babakar-zais 500, and the Tokhees furnished 1,000.

The Tokhees received 1,60,000 Tabrezee rupees (10 annas each) per annum thus:—

1064 Swars at 100,	APPLY:	nessiii	10.4 - 19	4	1,06,400
Mausabdars, (officers,)		1002			35,600
Hakim, (chief,)	· - i=	-	1.		18,000
		BETTE STATE OF			1,60,000

The distribution of the Tokhees, as follows:

		File B	-khan	Meerza Pairo says,				
Kishyanees,	AL IN CANA	21% A.M.		50		H. SWITE		66
Bata-khel,	no estad			30	nie-hau			36
Jalal-zai,		Later and I		180	04400	10.00 10.00		164
Pero-zai,	ar we trans			144		100	100	140



and the second of the second	Ashoor-khi		Meerza Pairo says,
Baso-khel,		3	33
		3	23
Meeran-zai,	10	4	104
Noor-khel,	8	1	81
Mahammad-zai,	33	0	330
Aka-zai,	3	1	31
	Valenty -		T
	1,00	16	998
The distribution of the	Mahammad-za	is is as follo	ws: Sendance
Peerak-khel,	16 Sh	h Husen-kh	el, 16
Kalloo-khel,	17 Um	ur-khel,	5
Isse-zai,	18 See	kak,	18
Fakeer-zai,	15 Has	san-khel,	5
Babree,	7 Ada	am-zai,	?
Burhan-khel,	? Hot	tak-zai,	30
Pato-zai,	70 Ak	rabe-zai,	9
Moosa-zai,	50 Mo	osa-khel,	16
Karmoo-khel,	12 Sac	ee-zai,	3
Buhlol-zai,	9 Ba:	zik-zai,	3
Nato-zai,	4 Kh	an-khel,	18
Peerwalee-khel,	9		DENTENDED IN COMPANY
The State of the S	ANTILET, SE TEN	and district	ALCOHOLD TOWN BU-
The Jalal-zai horsemen			to Wen spinsowich
Peroz-khel,	25 Na	no-khel,	18
Bahram-khel,	43 Siy	/a-zai,	28
Dawut-khel,	. 15 Ba	hlol-khel,	. 44
Najo-khel,	. 9		
The Pero-zai horsemen	were thus divi	ded:	a filled headstood
Sayud-khel,		kee,	31
Asho-zai,	24 Sur	e_zai,	29
The Meeran-zais say th		e of Savud	Rahmat-khan they
furnished 133 men in the f	ollowing prop	ortion :	
Nuhradeen,		a-khel,	39
Akhe-zai,	30 Mo	ghal-zai,	28
Uhwa-zai and Kute-zai,			

The distribution of the Hotakees was as follows:

Malee-zai,			24	Maroof-zai,		No. 14	11
Khade-zai,			9	Utman-khel,		44.0F	12
Tadzak,			12	Isak-zai,		District to	70
Barat-zai,	1.0		16	Aka-zai,			16
Ramee-zai,	**		70	Baee-zai,	4.9	-	25
Umar-zai,	100	100	12	Baba-zai,	0/2.54	A PARTY	6
Toon-zai,			34	Saghad-zai,			32
Tahiree,			7	Alee-zai,	District to		6
Saut-khel,			16	Polad,		or each	3
Eesaf-khel,			16	Tahiree,			* 6
Issozai,			1				

Again the distribution of the Isak-zai Hotakee's 69 men is as follows:

Kutte-zai,		14	Hade-zai,	 	25
Kudeen-zai,		7	Umar-zai,	 Jack in	7
Kundle-zai,	 Alexander of the	14	Mandeen-khel,		2

The Sursat, or provisions for the royal army in its march through the Ghiljye country was thus collected:

Kala-i-Ghiljye, 4-5 Hotaks, 0-5 Tokhees.

Sar-i-Asp, Babakar-zais.

Tazee, Mahammad-zais, Moosaka, Pero-zais and Jalal-zais.

Nothing now remains but to note the locations of the different tribes.

The Tokhees are to be found in the Arghandah valley, the Tarnak valley, the Khakak valley and in Nawak.

The Hotakees are, generally speaking, found in Marghah, and in the Syorye, (shady side) and Peetao, (sunny side) of the Bare-ghar and Surkh-koh hills, and more particularly speaking, the Isak-zais are found in Marghak and Ataghar.

The Malee-zais in Girdezangal and Gha Bolan.

The Barat-zais in Roghanai.

The Aka-zais in Kharnai and Dumandia.

The Tun-zais in Syorye.

The Umarzais at Mandav.

The Sagharees (Saghadais) at Mandah.

The Ramee-zais at Ataghar, and the Baee-zais at Sorah and Kingar.



The Surkh-koh is called in Pushtoo Sirah-ghar.

The Babakar-zais are found at Swad-zai, Jungeer, Sar-i-As (asp,) Shah Mardan and Nawah.

The Shamal-zais are found at Shibar, Halatagh, Jetz and Mundan.

Other information of a geographical and minute statistical nature regarding the Toran Ghiljyes is in my possession, as are the original Daftars which could not be generally interesting. The following one fact may be.

The scarped hill and barrack walls against which the Ghiljyes ran their heads, on the 21st May 1842, losing 400 killed, were their own handy work chiefly, (the garrison having merely finished them,) of the preceding autumn.

It being impossible to procure labourers from Candahar, I had occasion to call on the tribes to furnish labourers in the exact proportion they had formerly furnished soldiers to the Duranee kings, and they were mustered every morning by their respective chiefs, rod in hand. Being highly paid, (one rupee to every three,) they continued to work long after the winter set in, sleeping in the plain below the hill in open graves! two feet deep for warmth. Her gracious Majesty's head on the new Company's Rupees made a few demur taking them at first; but finding out their value they soon got over this prejudice against "the image;" and after spitting on the rupees and treading on them, took the "Buttars" as they called them home as lawful gain, without a self-accusation, it is to be hoped, of their having encouraged idolatry.

That money was little valued by the Afghans of the wilds (Sahra) before the British forces entered Afghanistan, the following will prove.

On my way from Cabool to Candahar in the winter of 1837-38, I several times failed in getting milk and butter, while my attendants who had travelled before in the country were plentifully supplied. I found the reason to be that I offered money, while they gave needles, and odds and ends of coarse Cabool chintz.

On one occasion after marching all day, I lost my way and got benighted, and separated from my baggage. On arriving at one of these Ghiljaee khels or wild encampments, they allowed me to enter their tents, but nothing would induce them to kill a sheep for money, (they even refused to take a gold ducat,) insisting on having cloth; and the sheep was finally purchased by one of my attendants giving an old Ca-

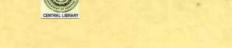


bool choghak. On leaving Candahar for Quetta, I laid in a stock of needles, little looking-glasses, pewter rings and wooden combs; and again on leaving Kalat-i-Naseer for Shikarpoor, I was obliged to lay in a stock of pieces of coarse native white cotton cloth. For a whole piece I used to get a sheep; and eggs, fowls, milk, butter, &c. were only purchasable by the yard of cloth. In the autumn of 1841, even in the Ghiljaee country, melons were sold for equal weight of wheat, and grapes for three times their weight in wheat.

On the army first arriving at Candahar, the wild hill Afghans who got paid for the supplies they sold in Company's rupees, took them to the town shroffs, and paid one and two annas batta to get them changed for the "Kalamah-dar" or Candaharee rupee, thus giving eighteen annas for eleven or twelve; not being able to count, they talked of having a "kid-skin" of rupees.

List of Places on a portion (upper) of the Arghandah River.

Left bank.	Right bank.	Left bank.	Right bank.
THE RESERVE OF THE PERSON NAMED IN	Arghasoo.	Parsang,	
Princes on June 2012	Takhoon.	SAME SHOW AND ADDRESS OF THE	Mamachakh.
	Salem.	Sangeesar,	And the Residence
Meezan,			Surkhakai.
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	~ Dohlah.	Saigaz,	THE STATE OF STREET
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Anthony will be de-	e Jadang.	Jijgah;	Narrai.
	a Jakhtoo.	Bargah,	Sardarrah.
(A) 医型型 (B) (B)	Chalakoor.	Girdai,	Biland warkh
I SEE THE PROPERTY	Maidan.	Shukushta,	Ulachee.
Takhoonak,		Badar,	Shaigan.
Z dichoonian,	Surkhsang.	Nalee,	Thakr.
Taj Mahammad,	Zamana.	Kadalak,	Sapitao.
	as of the foreigner	Pumbazar,	Duberak.
Walagai,	Molai.	Tanghutai,	Pezgul.
	Molai.	Karulghan,	Chaghmagh.
Madat,		Karuguan,	Oman, or
	Bagh.		
Mossai,	Molai. slom Bagh. wy		Jirghanai.
Gazah,	ALL CAPPEND AND DESCRIPTION OF THE PERSON OF		Kaftalak.
The state of the s	Beetab.	THE PART OF THE PERSON OF	Solan.
Tento something	Gumbat.	Kharnai,	Bareezar.



The Arghandah river rises in Malistan, then comes to Fort Alee Gouhar, then to the Fort of Bakar Sultan, called Sangi Mashak, west bank; thence Turgan, west bank; thence Gazah, west bank; thence Bal hasarr, west bank; thence Mughaitoo, west bank, (near Kharnai.)

The Attah Hazarahs (uppermost) join into the Kalandar Hazarahs (who are next below them on the river) at Kharnai. The boundary of the latter and the Peroz-khel Tokhees is at Avkol, the boundary of the latter and the Bahlol-khel is at Fort Husen, the boundary of the latter and the Perozais is at Aldai (Nulla Zardad,) the boundary of the latter and the Khan-khel is at Beetab.

#### Route from Kalat-i-Ghilzyze to

Dera Ismail-khan, Kalat-i-Ghiljaee, Urgakoo, Dab-i-Pishai, crossing the Pass; Fort Konah in Marghah, Fort Maiyar in Halatagh, Wuch Marghah, (or Kaimkhelee,) Darwaze, beyond Jetz; Sargadee, Ismail-khan, Kanokee, Gul Wanah, Kurman-i-Sar, Ashewat, Kashkalwee, Handeerah Kalan-i-Kakeree, Chukhah, Jyob, Shagee, Sarmaghah, passing Gholaree Pass; Neelye, Tormyumah (Gomal,) Kats-speenkee, Man-jigarah in Daman, Kulachee, Gada-i-Gandipoora, Dera Ismail-khan, Sakaree, Jetz, Yaiyak-beree, Shaheedan, Turwoh, Kasakuk, Dakha (deserts,) Taraghaz, Dochnah, Lakatijah, Goostoee, Se-nika, Tsatsandai, Doo-mandee (Ghuznee road falls in here,) Kotkee, Kanzoor, Sarmaghah.

The Nasarees (Daoot-khel) having bullocks, first move to Hindustan by the Gholaree or Zawah Pass; then the other Nasarees, then the Kharotees, then the Myan-khels.



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#### JOURNAL

OF THE

### ASIATIC SOCIETY.

Report, &c. from Captain G. B. Tremenheere, Executive Engineer, Tenasserim Division, to the Officer in charge of the office of Super-intending Engineer, South Eastern Provinces; with information concerning the price of Tin ore of Mergui, in reference to Extract from a Despatch from the Honorable Court of Directors, dated 25th October 1843, No. 20. Communicated by the Government of India.

SIR,—Agreeably to instructions conveyed in your letter, No. 3018, of the 7th of February last, I have the honor to subjoin such information as I have been able to obtain, concerning the probable cost of the tin ore of Mergui.

2. With the view of ascertaining its value in the home market, I transmitted, about the period of my first report on the tin of this province, a box of average samples of the ore, to a smelting establishment in Cornwall, (Messrs. Bolitho & Co.) having extensive connection with the tin mines of that country. In April 1843, Mr. Thomas Bolitho informed me, that—"The samples of once-washed ore produces about 70 per cent. of tin, and the twice-washed yields nearly 75 per cent. The metal is very good, being almost free from alloy; some of the samples which have been sent to me from the Malayan peninsula contain titanium.

"The ore appears to separate from the matrix very easily.
No. 161. No. 77, New Series.



"The consumption of tin throughout the world increases so slowly, and the supply at present being more than equal to the demand, there is little inducement to speculate in tin mines.

"The produce of Cornwall is 6,000 tons per annum, and we calculate that the quantity produced at Java together with what is raised in the Malayan peninsula, will rather exceed the produce of Cornwall. The average price of tin in Cornwall has been about 72s. per cwt., but it is now as low as 56s., which is the present price of the best Straits tin, and tin mines are suffering greatly from the depreciation in the value of their metal.

"It may serve for your guidance to know, that at this moment tin ore of the description of the sample twice-washed, would fetch in England about £ 46 per ton."

3. The following calculations of the probable result of a shipment of tin ore, and of the metal, have been obligingly made for me by two mercantile gentlemen of Maulmain. They are based on the lowest prices which, according to Mr. Bolitho, were obtainable in the market in April 1843, and show a probable profit on tin ore of 7s. 8d. per cwt.; but a loss on the shipment of the metal of 12s. 4d. per cwt. in one case, and 4s. 9d. per cwt. in the other.

July 1843. Tin ore from Maulmain purchased at 45 rupees per hundred viss, equal to 365 lbs.

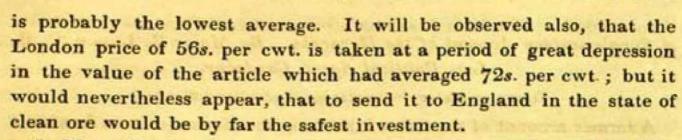
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Commission and London charges 51 %.	•	0	2	2			
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Sale price per Mr. Bolitho,					0	46	0
Leaves a profit per cwt	101 36				0	7	8



July 1843. Tin from Maulmain purchased at 77 rupees per hundred viss.

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Another calculation of November 1844.	dau	1000	-	
	R.	A.	<i>P</i> .	
Usual cost of tin in Maulmain, Rs. 77-8 per 365 lbs, on Rs	23	5	2	per cwt.
Freight to England @ £ 1-10 per ton,	0	12	0	
Duty, @ 10s	5	0	0	
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£. s. d.	die.	The same	U.C.	ALTERNATION .
Or, 0 60 9				
Assumed price in London, 0 56 0				
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Leaves a loss per cwt. of 0 4 9	m .	15 -	une	es per 365

4. The assumed rate for the ore at Maulmain, 45 rupees per 365 lbs., would be I think subject to a reduction; but that for the metal,



- 5. Many localities in the Mergui province in which the ore exists abundantly, have been already described and publicly made known; but little or no attention has been given to the subject by merchants of Maulmain. Their business consists principally in timber, piece goods and hardware, and they have no inclination to embark in mining speculations. A small shipment of ore, being part of about 21 tons collected by convicts and others at the Government expense, was made to England by Messrs. Bilton and Co. of Maulmain; but the quantity was so small, that no result has been made known by their home correspondent. At Malewan in the Pak-chan river at the southern extremity of Tenasserim, between one and two hundred active Chinamen are engaged in collecting the ore in the streams described in my third report of 8th April 1843, Journal As. Soc. Vol. XII. p. 523. They have been very successful, but there is so little communication with that part of the coast that no accurate statement of the result of their annual labours can be obtained. They convert it into metal, which comes with Tacopah and other tin into the Maulmain market.
- 6. Other localities equally productive and available to the private speculator have been indicated in former reports, and more are becoming known. A specimen recently obtained by E. O'Riley, Esq. from Henzai, north of Tavoy, is forwarded. It is said to be plentiful there; but, without multiplying instances, sufficient evidence has been recorded of the existence in the Tenasserim provinces of rich stores of the ore of this useful metal, and it has been also shown that there is no obstacle to its profitable production.

Mining or other operations of this nature supported by the Government, have generally proved unsuccessful in India; but the time may perhaps arrive, when the attention of private capitalists may be turned in this direction.

G. B. TREMENHEERE, Ex. Engineer, Tenasserim Provinces.



## A Supplementary Account of the Hazarahs. By Major R. Leech, C. B. Late Political Agent, Candahar.

[Drawn up under circumstances of peculiar difficulty.]

A former account of the tribes inhabiting the Hazarajat, was furnished to Lord Auckland's government, and printed with the other papers of the late Mission to Cabool, (Captain Burnes's).

I had hopes of procuring a written history of this tribe which I have reason to suppose exists, when I was obliged to quit Candahar with General Nott's force in August, 1842. It was, if I remember, said to be in the possession of the Chief of the Dai Kundee Hazarahs, whose son was at that time a hostage in Candahar.

The Hazarahs claim brotherhood with Europeans, saying that both are descendants of Japheth, the son of Noah.

The Hazarahs are called Moghuls by the Ghiljyes.

I believe that the Hazarahs in former times were like the Afghans of a subsequent period, planted on the confines of India.

They, I believe, held the high road from Cabool to Candahar and Herat up to comparatively speaking a recent period.

Many of the names of villages in the immediate neighbourhood of Candahar prove a Hazarah founder; and the tomb of one of their progenitors, Choupan, is on the high road between Candahar and Herat near Greeskh: the place is now called Khah-i-Choupan.

In a paper on the history of Kalat-i-Naseer, I mentioned my opinion that the Hazarahs extended as far as Shawl Quetta, from the name Takatoo of the mountain bounding that valley towards Pishing and Candahar; and from Kuchlah (which means caves in the Hazarah dialect), being the first stage from Quetta towards Candahar.

The word "Shev" both in the Hazarah and Brahavee dialects (Koodd-gal) means below, lower; for we find the Shev Hassarrs or lower Hassarrs, distinguished from the Bal Hassarrs or upper Hassarrs.

There is in the neighbourhood of Candahar the shrine of an Hazarah saint, who has the title of Hai-taz, (the rush rider). I have mislaid the detailed account of the miracle that got the saint this title.

The Hazarahs' simplicity is proverbial, and it is probable that they were cheated by the Afghans and Ghiljyes out of quite as much land as they were beaten off.

They hold fire-arms in greater esteem than their rivals, and do not, as they do, trust to the vaunted Toora (sword) entirely. They make excellent powder, and are capital shots; and, strange for a people inhabiting a hilly country, are good riders.

They feel ashamed of their Tartar cast of countenance and want of beards; and I invariably observed that the higher in rank a Hazarah chief was, the less he resembled his race.

They call the Afghans, "Avghoons." Such is their aversion to the Tartar cast of countenance, that it is reported they ask no question of their wives for presenting them with children, the images of some of their Afghan handsome neighbours; and the opportunities afforded a passing stranger, even, by some tribes are said to be most shameless.\*

As an instance of their want of polish, I instance the case of a Hazarah chief who visited me in the end of 1841 at Kalat i-Ghiljye. This man resided at so small a distance from town (Candahar), that had he been inclined he might have visited it once a week at least. As his services were required for our garrison, I made him a present of a shawl, and sent him round the fort to see the buildings and the commencement of our fortification. On his return, after signs of great uneasiness in his chair and sundry whisperings with his confidential attendant standing behind him, he at last confessed that he had a request to make before taking leave, if I would not be offended. This was, that in his tour round the fort he had been struck with wonder at a large copper deg (cauldron) used by the executive engineer to mix lime (the weather requiring warm water to be used), and that he hoped I would give it him instead (if I liked) of the shawl. It was of the common size used at cooks' shops at Candahar.

The vessel was accordingly purchased for him, and presented after being scrubbed as well as time permitted; and he left with it highly delighted, vowing he would make soup of a whole sheep in it and feast all the tribes. I never heard that the lime had any bad effect on the soup eaters. I have no doubt that this deg will after a generation or two have wonderful tales told of it in connection with the Faringees, who built Kalat in the autumn to destroy it in the spring.

<sup>\*</sup> The Afghans give their Dutch build in the following couplet: " Pushti koonash naghara darad, Hazarah dumba darad,"

I propose that this account should consist of the different memoranda found in my journal connected with the Hazarahs, according to the order of dates.

Memorandum, 19th July 1839, Candahar.—To the north of the Arif-khanee Baloche of Kejran, (to the north of Teereen) are the Babalee Hazarahs under Husenee-khan, and his nephew Mahmood-khan; and to the north of the Babalee are the Chora Hazarahs; 2000 families under Allee Husen-khan and Mahammad Husen. They are taxed one sheep each house.

Mahmood and his uncle Husenee both live at Zarafshan. Mehdee-khan was the father of Mahmood. The Babalee Hazarahs are reckoned at 5000 houses, and they are said to be able to furnish 200 horse and 300 foot. The Sardars of Candahar collected yearly about 2 or 3000 sheep. The sister of Mahammad Husen-beg Dai-koondee is Mahmood-khan's wife, and Mahmood-khan's sister is the mother of Khairulla-beg Dai-koondee. Gizon, called the Cashmeer of Western Afghan-istan, was originally a government post. It is now enjoyed by Mahammad Takee Beg, a Dai-kundee Hazarah. It was through the Hazarahs that the revenue called Sang-o-baz (the goat and stone) became known. When a tribe is next to independent, it is said to pay a stone-and-goat revenue; that is, the collectors of revenue are met with an old lean goat in one hand, and a stone in the other, as much as to say, if you do not put up with this shadow of tribute you shall have this (the stone) on your head.

Memorandum, Chapa-khanna Karabagh, 24th June 1841, and 1st September 1842.—The four Dastaks of Ornee are Tamakee Taltamoor, Doka, and Sagadee. These, with Aldye, Mahammad Khoja, and Meer Mahammad, are sons of Hajee. Their chiefs are Husen-khan, Hasan-khan, and Mahammad Takee-khan, sons of Meer Alee-khan, son of Zakee-khan. The Mahammad Khoja Hazarahs are under Mahammad Husen-khan the son of Gulisthan-khan, the son of Abdul Masam-khan. These are the Hazarahs of Karabagh; they are at enmity with the Tarakees, which was amply verified on the approach of General Nott's force to Karabagh in 1842. The Ghiljyes had forsaken their forts from fear of the force, and on coming up to Karabagh the Hazarahs were seen hurrying across the plain on their beasts of burden with empty bags to sack their neighbours' forts. Some of the Hazarahs accompanied the force

one or two marches further, in hopes of getting the contents of the other Ghiljaee forts in advance.

Memorandum, 28th June 1841.—There are four Dastaks of Jagharee Hazarahs; Garai'ee, Baghochury, Izdaree, and Attak.

The three other Dastaks are Kalandars, Pashahee and Sherdagh. The seven are called Mama. Sultan Bakar is by tribe an Attak; his father was Augoobeg, son of Sufee Sultan: he has four sons, Sharhat-i-Alee, Jamshed, Bijan, and Ismail.

The Arghandah river rises in Malisthan, then comes to Fort Alee Gouhar-khan, then to the Fort of Bakar Sultan, called Sang-i-Mashak, west bank; thence Turgan, west bank; thence Gazah, west bank; thence Bal hassarr, west bank; thence Kunghaitoo, west bank; Shev hasarr, west bank; thence the Tokhees to Siya Sang of the Khan-khels, east bank; thence Mezan, east bank, to Dahlak.

Memorandum, 18th August 1841.—Karez-i-Salai is a Supzee, among the Dai Choupan Hazarahs, his residence is Shaee: to the west he has Meerza Sultan Sohbat-khanee Hazarah of Karez and Chalakoor; to the east Uruzghan Gundah Hazarahs; to the north the Khojakais under Tamas-khan; and to the south the Khan-khel Tokhees of Bagh.

The Dai Choupans, in all 2,500 families, are divided into three clans.

Wachak, under Murtuza-khan.

Orașee, ditto, Murza Sultan.

Baintan, ditto, Zardad Sultan.

The Wachaks are divided into four.

Paindah Mahammad, Bubash, Daoozai and Sheerah.

The Orasee are divided into three: Isfandyar, Ghulam-i-Wakee, and Baitamoor.

Baintan had five divisions: Wuttee Murghans, Sherak, Malik Maham-mad, and Mahammad Beg, of which are Sult Alee and Zardad Sultan.

The Dai Choupans are originally from Greeshk; the tomb of their progenitor is still in existence, (Khak-i-Choupan.)

Sadelchee was the first chief of Kalat-i-Ghiljye.

Paindah Mahammad, Daoozai, Sohbat-khanee, and Mahammad-zais of Shoee are all Akkahs.

The river of the Paindah Mahammad is Seran, of Meerza Sultan Baghoochar, and of Zardad Sultan Sousah.



Besides the revenue of the Dai Choupans (3,000 sheep, goats and lambs,) that of Chalakoa (a desirable place by all accounts to spend the winter, in preference to Kalat-i-Ghiljye) under Kongharee was 600 sheep, goats and lambs, and 12 Kharwars (120 maunds) of grain.

Memorandum, 15th October 1841; Kalat-i-Ghiljye. The boundary between the Kalandar and Jaghuree Hazarahs is at Oloom of the Salai Kalandar Hazarahs; the place is not on the river Arghandah, it is near, and almost the same as Gardoon-i-Nungoo.

The boundary of the Kalandar Hazarahs and the Tokhees is at Avkhol on the Arghandah, which belongs to the Kalandar Hazarahs.

The places of the Kalandars are Mughailoo, Gardoni Kotal, Oloom, Gardoon-i-Murgo, Doom-i-Sago, Surkh Kol Ablecto, Gardo, Bayh, and Moklai. The chiefs, their titles and residences are Alee Bakheh, son of Ghulam Husen Khan, at Ableeto.

The Kalandar revenue is payable at Ghuznee in hair carpets (palas) and sheep.

Korghushtoo is a place of the Myanishees of the divisions Shekho and Ghulam.

They may be 100 families; they never regularly paid revenue to the Sardars of Candahar, but are assessable by the king.

The Shekhos are ryots of Zardad, who takes one lamb from each house.

Sheep won't live in their country, but goats will; they die of rot in the livers immediately it reaches the gall. The cure is the gambelahs.

Memorandum, 6th November 1841.—Kalat-i-Ghiljye; the following is road to Mughaitoo Halan Rabat. Sebandee, Jijgah Gorgaran, Kasalghan on the Arghandah, Mughaitoo.

From Gorgaran Mughaitoo bears west, Hingai east, Bakhtoo north, and Karatash south.

The titles of the Hazarahs are Khan, Sultan, Ikhtyars, Wakee, Mehtar and Turkhan.

The Kalandars have to their west Ghulam-i-Wakee and Bubash Hazarahs, to the north Uruzghan under Zoulee and Sult Alee, to the east Attah, and to the south the Jalalzai Tokhees.

The Hazarahs of Candahar are on excellent terms with the Parseewans, (I have also heard them called Parsus) those at Candahar were origi-



nally brought from Persia by Shah Abbas the Great; they are of the divisions Ruzbyanee, Zanganah, Burbur and Siah Mansoor.

During the early wars of the Hazarahs and Ghiljyes, the latter burnt the dead bodies of the former that came in their possession, and only discontinued the practice (disgraceful to both parties as men and Mosulmans) on the former retaliating. The system of offering indignity to dead bodies is a favorite one with the Afghans.\*

The Hazarahs as well as Ghiljyes do not eat fish, although they agree it was made lawful food by their prophet.

In going down the river Arghandah we were struck with the fine fish in that clean part of the stream, and desired to have some; no one in the whole tribe could be found who knew how to catch them: at last a dyer who poached for his own use, (he was an inhabitant of Candahar, not an Afghan) volunteered his services with small pea-like balls of

\* On the very first day that I entered Afghanistan (the Khyber Pass in the autumn of 1837.) I observed that all the bodies of the Sikhs who had been killed near the Pass, (in the battle of Jamrood between Mahammad Akbar-khan and Huree Sing) had been heaped together.

On the breast of the corpse of Goda-khan Momaod Afghan, they lit a fire; he having been killed in our service.

The grave of the first officer who was buried after the army reached Candahar (he was murdered) was being dug into, when the resurrectionists were disturbed by my gardener going to turn water off into the garden, and a repetition of the attempt was alone prevented by my making the owner of the field responsible for the preservation of the tomb.

During the siege of Kalat-i-Ghiljye, the fire that had been kindled to consume the corpse of a Hindoo native officer was extinguished by the besiegers, and the bodies of the camp followers they had cut up were the next day hacked with their spades by the cultivators who came to the spot to turn water into their fields.

The graves of those who were killed in 1839 at Ghuznee were in 1842 found defiled. It became at last necessary on the march to bury under cover of tents, and to use every ingenuity to conceal the spot which in many cases was of no avail, and no preventative against exhumation. I have lately heard that all the graves at Candahar have been opened by Umar-khan, the son of Sardar Kobudil-khan, who intended to burn the mouldering bones with horse litter; but the Mullas obliged him to content himself with scattering them about the plain.

Graves of Mohammadans in Afghanistan are opened for the sake of the shrouds, by a set who are thence called Cafan Kash, and great excitement was occasioned in the winter of 1837 in Cabool, by a young married woman of rank having opened a newly made grave. She had been persuaded that, if she succeeded in giving to her rival (husband's second wife) to eat halwah cooked on the breast of a corpse, she would become the sufed-bakht (white-fortuned) or favorite. Hog's lard rubbed in the hair is considered a specific for estranging affection.



flour mixed with gall and Marg-i-Mahee, (the fish-bone nut) which he threw into the stream, the surface of which was soon covered with floating fishes in a state of intoxication, (not dead). Bringing them to land was good fun for the boys who had assembled.

Observing in the crowd of spectators the village Mulla (who are generally half-read) who evidently regarded us as cannibals, I enquired why they did not eat fish; he replied, he could not tell me, but it was undoubtedly lawful food. A good stock of fine large fish being now laid before us, I begged the Mulla to make them lawful eating; this, he ought to have known, could be done by merely dashing the live ones thrice to the ground. He however looked disconcerted at my request, and hesitated. After a short time, during which we all kept our countenances, he called for a knife and was about to cut their throats, when I suggested that the bellies were the proper places; and he actually, after pronouncing his solemn "Bismillah Alláh Akbar," went through this first part of the cook's duty: and, as he looked after us as we departed to breakfast, I have no doubt he said to himself, "These Faringees are after all not such a dirty feeding set of Kafars as they are said to be."

The Hazarahs, notwithstanding the general enmity between the tribe and the Ghiljyes and Afghans, have their friends and allies among them; three Maliks of the Alee-khel Ghiljyes have gone over to Sultan Bakar, the deadly enemy of their tribe, having quarrelled with their brother Malik; their names are Mato, Natho, and Shahabudeen.

The Hazarahs have been driven out of part of their country by the Wardaks (from the stages of Haft Asya, Hyder-khel, Shashgou, &c.) These Wardaks are said to amount to 9,000.

The Hooree Wardaks, who now occupy this part of the road from Ghuznee to Cabool, are divided into three clans; Malee-khel, Badud (Bahadur) khel, and Hyder-khel.

The Malee-khels are divided into Hasan-khel, Hasrah, Muradee-khel, and Shadee-khel.

The Badud-khels into Panchpaee Zeerak and Khaja Khidr, and the Hyder-khels into Tokur-khel and Eesa-khel.

The Hoorees are reckoned at 2,000 snookes, or houses.

In their hills there is a grass called Tabarghan that sheep feed on, which imparts a fine flavour to the ghee, milk, and its other preparations.



There is also a red flower, called Sursan, which is boiled, and the strained water used as a cooling drink.

The slaves in Afghanistan are chiefly Hazarahs, and the Afghans say it is as lawful to buy and sell them as negroes.

N. B .- I have, I think, a good account of the Hazarahs dependent on Cabool in my "Vicovitch's Cabool," a work which I hope some day to have time to translate. It is composed of accounts of the different districts of Cabool, drawn up at the request of that Russian agent, during his residence at Cabool in the latter end of 1837 and beginning of 1838.

Rough Notes on the Zoology of Candahar and the Neighbouring Districts. By Capt. Thos. HUTTON, of the Invalids, Mussoorie. With notes by Ed. Blyth, Curator of the Asiatic Society's Museum.

No. 1. Vespertilionidæ. Two species of Bats are common at Candahar, a large and a small kind; the latter I preserved in spirits and have sent you, though I fear they are spoiled.1 This species is very common, and may be seen from February till towards the end of

1. They arrived in excellent condition, and may be thus characterized :

Pipistrellus lepidus, Blyth. Length three inches and one-eighth to three and a quarter, of which the tail measures one and a half; alar expanse eight and a half to nine inches : fore-arm an inch and three-eighths, or a trifle less; longest finger two inches and a quarter; tibia half an inch; foot and claws five-sixteenths of an inch. Ears smaller than usual among the Pipistrelles, measuring from lowermost anteal base half an inch, and their tips spreading to an inch asunder; tragus subovate, and curved as usual. Sides of the face very tumid. General colour a light yellowish-clay, pale sandy or isabella-brown; underneath paler: the volar membrane light dusky, and the inter-digital at base towards the wrist, also the tip of the wing, and a broad border between the leg and proximate finger, with the fingers themselves, of the same light hue as the fur of the body.

Captain Hutton's large species is not improbably the Noctulinia noctula, v. N. altivolans, (White) Gray, common in Europe; for I doubt much the distinction of Mr. Hodgson's Vesp. labiata from the noctula, and a very closely allied species, if not the

same, has been described by Mons. F. Cuvier from Sumatra

The description of habitat resorted to by the third species is that of Rhinolophus

perniger, Hodgson, v. luctus (?), Temminck, further to the eastward.

It may be remarked here that Elphinstone mentions Monkeys, as found only on the north-east parts of Afghanistan; a statement which does not appear to have been since verified .- Cur. As. Soc.



October, flitting about in crowds in the twilight hours of evening; they shelter during the day in holes of houses, walls, and rocks.

The larger kind I have only seen occasionally on the wing, and never possessed a specimen. There is said to be another large kind found in the limestone caverns which occur in the mountains, but I suspect it to be the same.

No. 2. Felis tigris. Is said to occur in the jungles of Bhawulpore along the banks of the Sutledge, but I saw no traces of it. In the lower parts of the country, towards Scindh, I do not think it occurs. It is not in Afghanistan.<sup>2</sup>

No. 3. Felis leo. Is said to occur in some parts of Afghanistan; but

2. According to Elphinstone, Tigers are to be met with in most of the woody parts of Afghanistan : and Mr. Vigne remarks that the Tiger is "said to be well known" upon the Sufyd koh mountain. Sir John McNeill saw one killed in Persia, at the foot of the Elboorz mountains, near the Caspian; and Morier states that it occurs in the vicinity of Tabreez, mentioning that he saw the skin of one that had been killed there a short time previously. Old Tournefort relates that the middle region, and even the borders of the snow limit, of Ararat, are inhabited by Tigers (?). He says that he saw them within 100 yards of him, and that the young are caught in traps by the people round the mountain, to be exhibited in shows of wild beasts throughout Persia. At Grusia, at the foot of Caucasus, a large one is mentioned by Kotzebue, and supposed by him to have been driven by hunger from the plain of Baghdad. Mons. Menetries (I think, for I have neglected to cite the authority in my note book,) relates that-" During our stay at Lenkowa, I had the good fortune to obtain a Tiger that had been killed only fifteen versts off. It did not appear to differ from the Bengal Tiger, even in the skull. It appears, as I subsequently learned, that one at least is killed every year in the vicinity, having been pursued perhaps by hunters, till it sought refuge in the neighbouring forests of the Kour. It is not, I believe, found in Caucasus, the skins sent thence to Europe having probably been brought from Georgia, whence those of Leopards are also sent." Lt. Irwin states, that the Tiger is found as far as Tashkund, but in that temperate climate he falls much short of the Bengal Tiger in strength and ferocity. Burnes also speaks of "Tigers of a diminutive species," found-in the valley of the Oxus; and Humboldt and Ehrenberg observed them so high as the latitude of Berlin: they are said to occur even on the banks of the Oby : and Du Halde speaks of them as common in Tartary and China. In Japan they are stated to be covered with a thick coat of long soft fur. In the Himalaya they reach to an elevation of 8,000 feet, but are rare as far north as Simla, and they are said to be smaller in the N. W. provinces than in Bengal. McClelland affirms that they are a great scourge to the inhabitants of Kemaon. Referring, however, to the more western portion of the range of this animal, and even to the northern, it is necessary to be on guard against the frequent misapplication of the name Tiger, which, in South Africa, for instance, invariably applies to the Leopard, and in S. America to the Jaguar; in Van Dieman's Land even to the marsupial Thylacin: and with respect to a remark above cited, referring to Leopard skins being brought from Georgia to the Caucasus, it may be noticed that Guldenstadt describes the Leopard to inhabit the rocky parts of Caucasus, chiefly to the south, about Tiflis; being of rare occurrence to the northward .- Cur. As. Soc.



I doubt it, as I never saw a skin nor any spoils of the animal, nor could I find any one who had seen it.3

No. 4. Felis leopardus. This animal is common in the mountainous parts of Afghanistan, and is destructive to flocks and cattle; it seldom attacks man, though the Afghans have a great dread of it. The skins are prized as saddle-cloths, and are thrown over the saddle, with the tail fastened behind to that of the horse.

No. 5. Felis chaus, (vel erythrotis, Hodgson). This is not an uncommon species on the hills of Quettah and other parts of the country.

N. B.—"Seeah Gosh" is the name of a Lynx in Persia, i. e. "Black Ears."

No. 6. Felis ——? A spotted skin of a small Lynx, the only one I saw: it was brought in its present state from the Huzarrah hills.

No. 7. Felis catus. The domestic Cat of the Afghans is very similar to that of the hill people in the Himalayan districts, running into all sorts of varieties as to colour, as they do with us, although the most general is a dark grey with black spots and stripes.

No. 8. Canis —. The domestic Dogs of the Afghans vary according to the climate. In the hilly tracts they are large and fierce;

3. Elphinstone remarks, that the only part of Afghanistan where he had heard of the existence of Lions, was in the hilly country about Cabool, and there they are small and weak as compared with the African Lion. "I even doubt," he adds, "whether they are Lions." The Lion is well known to occur, however, both in Persia and in Western India; and, according to Lieut. Irwin, some are found as far as Tashkund, in a northerly direction and an easterly. J. A. S. viii, 1007.—Cur. As. Soc.

4. A Candahar specimen forwarded by Captain Hutton is of moderate dimensions, with rather long fur, very pale in colour, and the spots a good deal ringed, including those

along the back line .- Cur. As. Soc.

5. This is the Felis caracal, Schreber, of which the Society has lately received a specimen, killed at Jeypoor, from Captain Boys. It extends sparingly over the Upper Provinces, but appears not to occur in the peninsula of India: westward it inhabits Syria, and the whole of Africa from Barbary to the Cape of Good Hope. F. chaus is common throughout India, from the Himalaya southward; and extends even to Arracan.—Cur. As. Soc.

6. This seems to me to be the British Wild Cat (Felis sylvestris, Aldrovand, commonly referred, but very doubtfully, to F. catus, Lin.; the former not occurring in Scandinavia). Its tail, however, would appear to taper, so far as can be judged from the open skin; whereas the tail of the British Wild Cat does not taper. Judging from memory, of the figure published by Mons. F. Cuvier, I much suspect it to be his F. torquata: but the colour and markings are quite those of F. sylvestris.—Cur. As. Soc.

7. The domestic Cats of India are smaller than those of Europe, and are very commonly of a grey colour without markings, except on the limbs, and some more or less confluent black dorsal lines; the feet and tail being also black, to a greater or less extent. This is a style of colouring never seen in those of Europe (of unmixed breed); and the



and approach somewhat in appearance to the degenerate breed of Bhotan dogs, such as is found in the lower hills of the Cis. Himalaya. Others are not very different from the common village dog of India, except perhaps that the bark is more decided in its tones, and the hair longer. These appear to be the mere effects of climate. There are likewise Turnspits and Greyhounds: some of the latter are good and fleet, with smooth short hair; others are large and clothed with long silky hair. At Cabool, Pointers are said to occur; but in the more southern parts I saw none.

true tabby, so common in Europe, is never seen in India: I mean the tabby with black ground and broad pale streaks peculiarly disposed; for the grey with black tiger-streaks is found in both regions, only that the Indian are of a purer grey than the European. The long-haired Kashmir Cats, when dark, are often of the same unstriped grey with black dorsal streaks, feet, and tip of tail, as the Indian; and, I think, I may add that the Indian are more generally partially or almost wholly white, than is the case in Europe. Wholly black Cats are certainly less common than in England. By the way, Elphinstone states that Cats of the long-haired variety, called Borauk, are exported in a great number from Afghanistan, but are not numerous in Persia, where they are seldom or never exported.—Cur. As. Soc.

8. Lieut. Wood, in his ' Journey to the source of the Oxus,' p. 396, mentions a breed of Dogs, at Kunduz, called Tazi, "which could not but have found favour in the eyes of an English sportsman: it is a breed which, for strength and symmetry, vie with our Greyhound, and in beauty surpass it." Also, he speaks of the "Spaniel, from Kutch, and others of mixed breed, but possessing keen scent, and some of the qualities of our pointers." Lieut. Wood also informs us (p. 374), that "the Wakhun Dogs differ much from those of India, and bear a general resemblance to the Scotch Colly. They have long ears, a bushy tail, and a frame somewhat slender, being better adapted for swiftness than strength. They are very fierce, make excellent watchers, and will fight dogs twice their own weight. Their prevailing colours are black or a reddishbrown; the latter often mottled. The breed is from Chittrah, and so highly are their game qualities valued, that the Scinde Ameers have their packs improved by importations from this country." To my friend Mr. Vigne, we are indebted for a description of " the Scinde hound, as it is usually termed, which," he remarks, " is a race peculiar to the country, and considerable care, I believe, is bestowed upon the breed. It is a large and fierce animal, smooth-haired and usually white, and with sharp ears: a cross between a thorough-bred mastiff and a greyhound, would much resemble it. In general figure, but with a more savage expression, it is not unlike a large English coach dog: an animal which, somehow or other, in the older books of Natural History, has obtained the name of the Harrier of Bengal. Although not probable, yet it is not actually impossible, that the original breed may have been brought home by the early European traders from the mouth of the Indus, and that the name may thus have originated in a not unlikely confusion of localities." 'Travels in Kashmir,' &c. II. 411. The same gentleman gives a description of the magnificent sheep dogs of Kashmir, (ibid, 11. 149), which however would appear to be identical with the ordinary Tibetan mastiff. Of this race, many are annually brought to Calcutta; and with them I have seen a dog very nearly resembling the Exquimaux dog, which is found likewise in northern Siberia, where, for purposes of draught, it is fast superseding the Rein-deer .-Cur. As. Soc.

No. 9. Canis aureus?, var: I have no specimen. It is abundant along the course of the Helmund and Argandab rivers, at Girishk and Candahar, as also in the Bolan Pass, and appears to be identical with the variety found in the Himalaya. It may perhaps be the "Oxygous indicus," of Mr. Hodgson. It is found in packs, and cries at night like those of the plains of India, and in this it seems to differ from the Himalayan variety, for although I have often seen many of the latter together at Simla, I never heard them cry. May not a dread of the Leopard keep them silent in the hills?

No. 10. Vulpes [flavescens, Gray.] The Fox of Afghanistan, or at least of the southern and western parts, is apparently the same as our Himalayan species, though somewhat less in size. 10 My specimens are all females, and the measurements are as follow, namely:—Length from nose to insertion of tail two feet; tail seventeen inches, equalling three feet seven inches. Height at the shoulder fourteen inches. Another:—Length to insertion of tail two feet; tail seventeen inches and a half, equalling three feet five inches and a half. Height nearly fifteen inches at the shoulder. Farther description I omit, as you can supply it from the specimen sent. The species is numerous in the valleys around Candahar, hiding in burrows and holes in the rocks. The skins are soft, and are made into reemchahs and poshteens. The price is usually six annas a skin. Called "Robur." 11

9. Wild Dogs, in addition to Wolves, Jackals, and Foxes, are stated by Elphinstone to occur in Afghanistan. A Nepalese Jackal skin presented to the Society by Mr. Hodgson, appears to differ in no respect whatever from the Jackal of Lower Bengal.—Cur. As. Soc.

10. Since writing the above, I have compared the specimens with the Hill Fox, and there appears to be a deficiency in the white tip to the tail in Afghan specimens? T. H.

11. In Afghanistan, according to the late Dr. Griffith. "a large and a small species of Fox appear to exist. The former, which is perhaps identical with the large Himalayan Fox, I procured from Quetta and at Olipore, at which place it is not uncommon. The small kind seems to resemble the Fox of the plains of N. W. India." Capt. Hutton's specimen is evidently of the small Afghan species, which is Vulpes flavescens, Gray, An. and Mag. N. H. 1843, p. 118, and thus described:—"Pale yellowish, back rather darker; face, outer side of fore-legs, and base of tail, pale fulvous; spot on side of face, just before the eyes, the chin, the front of fore-legs, a round spot on the upper part of hind-feet [or rather legs], and the tips of the bairs of the tail, blackish; end of tail white. Hab. Persia." The winter fur is long and soft, and is of two sorts; a shorter and delicate under-fur, which on the back is darkish, passing to white on the sides and under parts, and pure white on the sides of the neck and shoulders in some, in others but partially so; and longer straight hairs, black-tipped, and yellowish-white along the back, whiter on the sides: the breast and under parts, with the exterior of the limbs above the mid-joint, dusky: ears brown-black to near their base: face ful-



No. 11. Vulpes bengalensis. Is common in Cutchee, where, previous to the advance of our army from Shikarpore, I have coursed them with my friend Major Leech, late Political Agent at Candahar. It does not appear to pass the mountains into Afghanistan, or at least I neither saw nor heard of it. "Loomree" of India. 12

No. 12. Canis lupus.—Wolves are common in the lower part of the Bhawulpore country, and likewise around Candahar. The dimensions of one from the latter place are thus:—Length, over all, four feet eight inches; height at the shoulder two feet three inches. The female is still larger. It appears to be the common Wolf of India. A pair of these animals crossed my path one morning in Scindh: they were going along at a smart hand-gallop, the largest, or female, leading. "Bheyriah" of India. 13

No. 13. Hyæna vulgaris.—This animal is common in Afghanistan. Length to insertion of tail three feet three inches and a half; tail fifteen inches, equalling four feet eight inches and a half. This was a female, and apparently not full grown. I had an opportunity of comparing this specimen with a male from Neemuch, which my friend Dr. Baddeley reared from a cub, and took with him to Candahar. There was no perceptible difference except in size, the Neemuch specimen being the largest. Dr. Baddeley and one native servant were

vescent, with dark patch before each eye: and the tail very bushy, a little fulvescent, and white-tipped. In summer dress, the long hairs have more or less disappeared; and, in a male before me, the inner fur is considerably deeper-coloured than in Capt. Hutton's female. A third specimen was received from Almorah, but the skin had doubtless been carried to the great Hurdwar fair. As a species, it is very distinct from the Himalayan Fox, and also from another, nearly allied to the latter, from Chinese Tartary, described in J. A. S. XI, 589.—Cur. As. Soc.

12. Mr. Elliot remarks of the Foxes of the Southern Mahratta country, that—" It is remarkable that though the brush is generally tipt with black, a white one is occasionally found, while in other parts of India, as in Cutch, the tip is always white." In Bengal it is invariably black. This animal is identified by Mr. Ogilby with the Canis corsac. Pallas, and certainly it agrees with the description of the latter, despite the great difference of habitat.—Cur. As. Soc.

13. I believe Mr. Elliot to be right in identifying the Indian Wolf, Canis pallipes of Sykes, with the true C. lupus, which certainly runs into varieties in the wild state, not only according to climate, but even in the same locality. Those of Chinese Tartary are very pale fulvescent, and are densely clad with matted wool during the winter:—absolutely Wolves in Sheep's clothing. Two specimens of the latter are in the Society's collection.—Cur. As. Soc.

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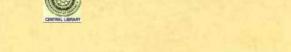
the only persons who could approach the brute with impunity. It was chained like a dog. I believe it effected its escape during Dr. Baddeley's return to Quetta on his way to Bombay. "Laggerbagher" of India.14

No. 14. Herpestes griseus?—Is this our Indian friend? It is very common at Candahar, with precisely the habits of H. griseus. The Afghans occasionally tame them, as do the natives of this country. It is called "Moosh-khoorma," by the Afghans. "Nyool" of India. 15

No. 15. Mustela [sarmatica, Pallas.]-This occurs plentifully at Quetta and Candahar, where it burrows in the ground, and produces three or four young at a birth. I had three pairs of these beautiful little creatures living in the same box, and although occasionally a little bickering occurred, yet on the whole they were amicable enough. A few days before I left Candahar (February 1841), I killed and stuffed one of these animals, and the following morning, when a young friend of mine opened the cage for the purpose of taking out another, we discovered that the two remaining pairs had waged war during the night with the odd one, whose mate we had stuffed, and had killed and partly devoured it. This is a curious fact, for the three pairs had lived together nearly from their birth, without farther quarrelling than an occasional wrangle over their food; yet no sooner was one pair broken, than the others set upon and killed the odd one. The Afghans call it "Gorkhus," or grave-digger, from an idea that it frequents burial grounds for the purpose of feeding on dead bodies. They even suppose that it lives entirely upon human bodies, and that it digs down into the graves where it banquets in undisturbed solitude. This notion, as may readily be supposed, is an

<sup>14.</sup> According to Vigne, this animal is very rare, if found at all, in Kashmir. Very rarely, also, it occurs in the vicinity of Calcutta.—Cur. As. Soc.

<sup>15.</sup> Mangusta pallipes, Blyth. This species is quite distinct from M. grisea of India generally, (including Scindh,) having much shorter fur, and approaching nearly to M. Edwardsii, v. auropunctata of Hodgson, if it be not a mere variety of the latter. It is most probably, however, distinct, and may be known from M. Edwardsii by its paler colour, its white throat, breast, and under-parts, which are but faintly tinged with the hue of the upper parts, and also by the light colour of its feet. In form and dimensions, it appears altogether to resemble M. Edwardsii.—Cur. As. Soc.

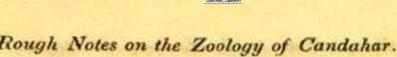


absurdity, the animal possessing in every respect the same propensities as its European congeners. Its food consists of birds, rats, mice, lizards, beetles, and even snails, all of which it finds in abundance in the gardens around Candahar. The first I saw was brought to me by a gardener who had dug it out of a hole; and a pair of these little savages was also found in another garden, where they had brought forth their young in a hole in the earth. The propensity to destroy life, and the thirst for blood, was soon manifested in those which I kept confined.

One of these animals refused to feed during a day and a night, although his cage was plentifully supplied with raw meat and beetles; but on introducing four Wagtails (Motacillæ), he was instantly aroused by their fluttering, seizing and destroying them one after the other as quickly as possible, and then retiring with them into an inner part of the cage, where he regaled himself on the blood of his victims, and indemnified himself for his long fast.

He ate little of the flesh, however, but greedily licked up the drops of blood as they trickled from the wounds of his slaughtered prey. He also destroyed a couple of large Rats (Arvicolæ) in a similar manner, showing great skill in seizing them so as to preclude all chance of their either injuring him or escaping from his fierce attack. When the rats were introduced into his cage, he was coiled up asleep in one corner of the inner part, but hearing them bustling about he was soon on the alert, and, cautiously advancing to the small round hole which formed the entrance to his sleeping apartment, took a survey of his unsuspecting visitors. He then drew back as if to avoid observation, until one of the rats approaching his retreat, he suddenly darted upon him and pulled him, in spite of his squeaks and struggles, into his sanctum, where he soon despatched his victim.

After a short pause, he again placed himself so as to obtain a view of the remaining rat, which shortly fared a similar fate to its companion. With the latter, however, there was a severe struggle, and the ferret was obliged to leave his inner apartment; yet although he rolled over and over in the scuffle, he never quitted his hold, and so dexterously had he seized his prey, that to bite or shake him off was equally impossible. He seized both rats precisely in the same place, namely,



immediately behind the ear, which at once secured himself from injury and soon rendered his foe helpless. When the rat ceased to struggle, he bit him once or twice sharply through the back of the skull, and as the blood flowed from the wound, the ferret lapped it up with his tongue. There was never any attempt to suck the blood of his prey, as is commonly but erroneously asserted of his tribe, though he continued both with birds and beasts to lick up the warm stream as long as it flowed from the wounds he had inflicted. One would have thought that the slaughter and the blood of the three birds and two large rats would have satiated his ferocity for a time, but although he made no attempt to devour the prey he had slain, his appetite for blood and murder was still as keen as ever, and scarcely had he finished his second draught ere he sallied forth to slaughter two young rats which had been introduced along with the old ones. These, being as yet blind, he seized by the nape of the neck, and having killed them with one bite, carried them also into his den, where he stored them up in a corner with their murdered parents, and the remains of the wagtails. In the evening, after nightfall, when all was getting hushed and dark, he came forth, and then regaled himself on the store of provisions he had laid up.

I was amused one day at the successful defence of a Shrike (Lanius lahtora). On introducing the bird into the box, it kept for some time twisting and turning itself about, and flitting its tail from side to side, watching the ferret with evident alarm. At last it flew so near that the ferret sprung at and caught it by the wing, and then lay with his fore-feet upon the bird, and began to peer sharply round to see that no intruder was near to interrupt his meal. As he turned his head back to begin the feast, the Shrike who had watched his movements, seized him so suddenly by the nose, that the ferret in astonishment and pain shook his head and jumped up, thus releasing the bird which I permitted to escape as a reward for his valour, and he flew away chattering, as if laughing in his sleeve at the trick he had played his enemy.

These animals are, strictly speaking, nocturnal, though not unfrequently on the move during the day; this however may probably be owing to bad success during the night in finding food, so that hunger may compel them sometimes to wander forth during the day time. Those



which I kept, having plenty of food to eat, slept almost throughout the day, seldom venturing abroad until nightfall, when they became very restless. They produce young about the end of March or beginning of April, when the winter has passed away and the warm weather is setting in, bringing in its train numbers of quail and other small birds on which the animal preys.

The Afghans assert that they are never seen during winter, and that although the summer is the season when they appear, they are never abundant. This latter assertion I can take upon myself to contradict, as they are far from scarce, for I have had during the summer months more than a dozen specimens brought to me.

If true that they are only found in summer, it is probably because they remain in a state of somnolency during the winter. The Afghans, however, are so little skilled in Natural History, and so addicted to lying, that it is a matter of much difficulty at any time to gather the truth from them. Some informed me that though the animal was not seen around Candahar during winter, yet that they were plentiful in the hills wherever there was good jungle cover, and that in summer they wandered down to the plains.

Now this assertion carries an error on the face of it, for an animal delighting in cold climates would not resort to the warm plains in summer, nor would the inhabitant of a warm climate seek the hills in winter. As therefore they only appear in the plains and valleys during the summer, the probability is (if they do not migrate to the south) that they remain dormant during the winter in holes and burrows. The latter is indeed the most probable, for to the southward the Candahar valley is bounded by the sandy desert which stretches away from the Kojah Amram range of hills to beyond Herat, into Persia. 16

These animals emit the same disagreeable fetid odour which characterises the genus. The body is long, slender, and extremely supple; the loins appearing, as in the feline tribe, to be so loosely articulated, that the hinder parts actually shake and totter whenever the animal puts itself

<sup>16.</sup> The truth, I suspect, will prove to be that the Mustela sarmatica occurs at all seasons, like its various congeners. Among the true Carnivora, I know only of the genus Ursus which fairly hybernates.—Cur. As. Soc.

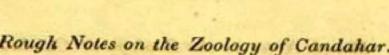
in motion. The tail is capable of being expanded into a good sized brush, and in this state forms an excellent defence for the back.

I once put a large snake into a box with one of these ferrets; the snake at once withdrew to one corner and sought for a hole to escape by; while the ferret arched its back, kept the head erect, and spread the tail out like a thick brush, which it turned over its back. In this manner he approached and retreated from the snake several times, watching its movements in some alarm. The ferret often tried to seize the snake by the back of the head, and as often received a bite in return, until the little beast became quite terrified. The snake was harmless, but too powerful for the ferret to attack successfully.

The markings of this beautiful species are as follow, namely, through or across the face are three distinct and well defined bands: the lowest one runs across embracing the eyes, and is of a brown colour; above this is a second narrower band of a pure white; and a third of black passes across the forehead, along the anterior base of the ears, descending to join the same colour on the throat. The chin and muzzie are white, the nose brown. The fore part of the throat, neck, breast, fore and hind legs, are glossy black. The upper half of the ears is white, with long hairs like a fringe; the crown and nape are also white with brown spots; the hinder neck and all the upper parts of the back and sides, are yellowish-white with numerous brown or liver-coloured spots of indeterminate shape. The tail is greyishvellow for two-thirds from the base, and the remainder to the tip black, Ears ovate, or rounded and open; eyes pale bluish or grey, by daylight. The head is broad, muzzle short, rounded and obtuse. Body long and remarkably slender, very supple, like the common ferret. The cry it makes when irritated resembles that of the mungoose (Mangusta [pallipes]).

No. 16. Mustela——? This is a skin which was given me by a Candahari, and came he said from the neighbourhood of Cabool. I suspect it to be the "Dil-kuffub" of Burnes's Bokhara.<sup>17</sup>

<sup>17.</sup> This is lost; it was "sooty black with a white crescent or gorget on the throat." T. H.



No. 17. Lutra [monticola, Hodgson, J. A. S. VIII, 320; apparently18]. These animals are abundant in the larger rivers, such as the Helmund and Argandab. I could never obtain more than the dried skins, which are prepared for the Bokhara market, and sell for eight Candahar or six Company's Rupees each. They are made into dresses, and are so durable as to be handed down from father to son! So at least runs the fable !

No. 18. Erinaceus collaris? This species I found in the sandy tracts of Bhawulpore, but as I have only the description of it left, I am uncertain as to its identity with the above named species.

The animal was clothed with stiff quills on the upper parts of the body; these were white on the basal half and jet black on the upper half: the face and under parts of the body were clothed with sooty-black hairs: ears large, ovate, and ashy-gray: snout long and projecting over the under jaw: eyes round, black, and of medium size: tail short and obtuse, nearly naked: chin white.

Another, in all respects like the last, except that the quills on the sides have pale brown tips. This may be the effect of age or sex, as the specimen was a female.

These were found in separate holes beneath a thorny bush called "Jhund," in the desert tracts of shifting sand between Sundah Badairah and Hasilpoor, on the left bank of the Garra, where they are numerous.

A third specimen seems to be distinct: all the under parts except the legs and tail are clothed with soft hair of a pure white, which passes also in a broad band across the forehead; immediately below this is a band of blackish hue across the face, embracing the eyes; and the rest of the face to the nose is greyish: nose naked: eyes round and black: ears large and ovate, ashy-grey: head rat-shaped: body and sides above armed with quills which are of a dirty white, or very pale shade of brown, for nearly two-thirds from the base; then a dark brown band, and the tips pale brown. This colouring gives the animal a pale brown appearance. The legs and tail are sooty or blackish, as in

<sup>18.</sup> L. monticola would seem to be the most common species of the Himalaya, and the Society has a specimen procured so low as near Moorshedabad, on the Hoogly. It is readily known by the comparative harshness of its fur. - Cur. As. Soc.



the foregoing: claws of moderate length, sharp and whitish. This specimen was smaller than the other two, and appeared to carry the back more arched than they did. It was found in the neighbourhood of "Shah Fareed," on the left bank of the Garrah. It is not unlike the European Hedgehog.<sup>19</sup>

The habits of all three were the same. They are nocturnal, and during the day conceal themselves in holes or in the tufts of high jungle grass. Their food consists of insects, chiefly of a small beetle which is abundant on the sandy tracts of Bhawulpore, and belongs to the genus Blaps. They also feed on lizards and snails. When touched, they have the habit of suddenly jerking up the back with some force, so as to prick the fingers or mouth of the assailant, and at the same time emitting a blowing sound, not unlike the noise produced when blowing upon a flame with a pair of bellows. When alarmed they have the power of rolling themselves up into a complete ball, concealing the head and limbs as does the European Hedgehog. On hearing any noise, it jerks the skin and quills of the neck completely over its head, leaving only the tip of the nose free, which is turned quickly in every direction to ascertain the nature of the approaching danger. If a foe in reality come nigh it, the head is instantly doubled under the belly towards the tail, and the legs being withdrawn at the same time, it presents nothing but a prickly ball to its assailant, and which is in most cases a sufficient protection. In this state it remains for some time perfectly motionless, until all being quiet and the danger past, it ventures first slowly, and almost imperceptibly, to exsert the nose, the nostrils working quickly as if to ascertain that all is safe again. It then gradually uncoils until the eyes are left free, and if satisfied that its foe has passed on, it opens up and walks off with a quick but unsteady gait; or if again startled by the slightest noise near it, it is instantly entrenched within its thorny armour. They use the snout much in the same manner as the hog does, turning up the leaves and grasses in search of food, and shoving each other out of the way with it when angry. They make a grunting sort of noise when irritated. They are remarkably tenacious of

<sup>19.</sup> The description of this third specimen applies very well to other specimens, which I have referred to E. collaris, Gray.—Cur. As. Soc.



life, bearing long abstinence with apparent ease,-a provision of nature highly useful and essential in the desert tracts they inhabit. It is probable, too, that they remain during the cold season in a semitorpid state, as the species which occurs in Afghanistan hybernates.

N. B .- From the forehead proceeds a powerful muscle, passing round the body along the medial line at the junction of the quills and hair; this enables the animal to protect itself in the following manner:-the head being bent downwards to the belly, and the legs tightly doubled under, the contraction of this muscle causes the edges of the skin, where the quills and hairs unite, (which is along the sides,) to be drawn together, by which means the limbs are shut in, and enclosed as if in a purse with sliding strings.

No. 19. Erinaceus [auritus, Pallas, (nec Geoffroy), or a closely allied species20]. This species is common from Quetta to Candahar. Length from tip of snout to base of tail about a foot; tail an inch and a half. Ears very large and rounded, cinereous; face, inside of ears and chin as far as the base of the ears, very pale cinereous, or nearly white; from thence all the under parts are sooty or rusty-black; head, limbs and under parts, clothed with soft hairs of a sooty black [or fuliginous-brown]; feet darkest; tail black, obtuse and nearly naked; toes five on all the feet; claws whitish. Quills banded with dirty straw colour and black. This is the description of an adult male taken at Candahar. They feed on slugs, and helices with which the fields at Candahar are overstocked; they also prey on worms, insects, and

The muzzle is rather short and broad: the dentition presenting three subequal pre-molars above, anterior to the scissor-tooth; the first being largest, and the third scarcely inferior to the second, but having a basal inner lobe; the small hindmost molar is also well developed, and is placed much less obliquely than in the European Hedgehog. Should it prove new, I propose that it be termed E. megalotis.

<sup>20.</sup> The Siberian E. auritus is described, in Pennant's Quadrupeds, to have the "upper jaw long and slender; with very large open ears, naked, brown round the edges, with soft whitish hairs within; tail shorter than that of the European Hedgehog: upper part of the body covered with slender brown spines, encompassed at the base, and near the ends, with a ring of white: the belly and limbs clothed with a most elegant soft white fur." The statements here italicized do not apply to the great-eared Afghan Hedgehog, the ears of which measure an inch and a quarter long posteriorly, and seven-eighths of an inch broad; their colour white: the dorsal spines are a little grizzled at the surface, and radiate from the middle of the back, meeting those from the sides, which are disposed irregularly as in the British Hedgehog.

lizards. They hide during the day in holes, and come out in the evening to feed. They retire to hybernate in deep holes in the earth in the end of October or beginning of November, according to the season, and remain in a semi-torpid condition till February, when they again appear.<sup>21</sup>

(To be continued.)

On the Course of the River Nerbudda. By Lieut.-Colonel Ouseley, Agent G. G. S. W. Frontier; with a coloured Map of the River from Hoshungabad to Jubbulpoor.\*

The leading article of No. 151, of the Journal Asiatic Society for 1844, is headed "Note on the Navigation of the River Nerbudda," compiled from information afforded by a number of officers. The map that is given with it, is part of the one that accompanied my report, forwarded to Government, (Lord Wm. Bentinck,) 13th June, 1834.

I find that I have not a copy of that report, and have requested Capt. Spence, the Deputy Commissioner at Hoshungabad, to favor me with one; but from private memoranda, I am enabled to state that the expense would be too great to calculate on an uninterrupted navigation, or admit of such water carriage as would be safe, and profitable. The nature of the rocks, compact basalt, or granite, renders it almost impossible to employ the agency of gunpowder to clear away the obstructions, it would be too slow a process for the extent to be undertaken. Again, supposing the whole distance cleared, including all the greater obstacles near Hindia, Mundhar, Dhardree, the Suhashurdhara Burkhery, Herunphal, &c. the elevation of the country at Hoshungabad being about 14 or 1500 feet above the sea, the rapidity and shallow body of the current would consequently be totally inadequate for boats of any size; and would be followed by the continued cutting away of the earth, and

<sup>21.</sup> Hedgehogs are found in the very hottest parts of peninsular India, and I have been assured, on good authority, of the existence of a species in the Bengal Soonderbuns. Four species from this country have been named already; but I have great reason to suspect the existence of others, and recommend that all collectors should preserve as many species of these animals, as they may be able to obtain.—Cur. As. Soc.

<sup>\*</sup> See Proceedings for February, 1845.

a renewal of obstructions. For the river is too large to be retained for any distance by banks or walls across it, so that if the inclination should here and there be moderate, as from Nursingpoor to Hoshungabad, Hoshungabad to Hindia, at Mundlaiser, &c., the descents would be still more precipitous at other places, between hills and rocks towering above one thousand feet on either side.

The country where these obstacles present themselves is mountainous, so that canals could not be cut from any given point above, so as to lead back into the river to a navigable part below, for the descent to the sea is, as it were, in steps. The possibility of making the river navigable of course exists, but the expense would be such as to prevent any attempt being made by the Government; nor do I think that the outlay could ever be made good. At Hoshungabad, the river is from 700 to 900 yards (and even more) wide; it often in the rains overflows its banks, which are at that place from 50 to 70 feet in height. What command could be hoped for, over such a body of water, running at the rate of six or seven miles an hour, only, increasing in size as it flows to the west, where the chief obstacles exist; at Dhardree vast trees are precipitated into the depths below, often coming up shattered into many pieces.

The native Surveyor in speaking of the rocks, said they were ironstone, alluding merely to their hardness. He mentioned the kindness of
the Bheels who attended his party along the river, in carrying some of
the sepoys and others taken ill, procuring supplies and game, but seemed to think the river could not be rendered available for navigation.
His map was written in Nagree on a large scale, and from that I reduced it, and sent it in the rough, as I had not time from my other duties
to do it more carefully. The chief coal discoveries were subsequently
made in the tours of the Division that I undertook annually, and disclosed mineral resources that are unbounded.

The coal found at Bénar, in my opinion, must be that used for rail-way communication; it cokes, as the Welch coal does when piled in heaps of any length, about five or six feet in height, and nine or ten feet base, forming an angle, covering it with dust, and allowing it to burn slow-ly from end to end. The coal was tried on the Indus Steamer at Bombay, 100 maunds did what 183 of the best Glasgow coal was required



to perform, heating one of the boilers of the steam engine fifteen minutes sooner than the Scotch coal.

The iron found at the same place has already been proved to be of the very best kind. The late Col. Presgrave constructed an iron suspension bridge of similar iron (found at Tendoo Khera on the north bank of the Nerbudda) at Saugor, which is at this present moment in as good order as the day it was made, 10 or 15 years ago. Having such coal, iron, and lime (which abounds), furnaces and founderies should be erected at Bénar, rails made, and the whole of the material supplied for the rail communication of India.

The produce of the richest country in India, the Nerbudda valley, would then find its way into the market; the wheats and white linseed now so much admired, and justly appreciated, would be attainable every where for seed, or consumption, and a country paying about 10 or 15 lakhs of land revenue (I do not include more than the Nerbudda valley and Baitool) would give triple that amount without being felt. So long as the present inefficient mode of carrying away the produce of an extensive agricultural district remains in use, the value of the land must be low; but on the abandonment of Bunjarra bullock-carriage and the adoption of rail lines, the prices of wheat, boot gram, linseed, &c., would more than triple themselves. It often happens that wheat sells for from 90 to 110 seers (90 Sicca weight) for a rupee; gram, 110 to 120 seers; linseed, 80 to 90 seers for one rupee; all of which grains are of the most superior description, and unequalled in India. Cotton, sugar, &c. are also produced, of the best description.

The part of the map I have now the pleasure to send, completes the course of the River from Jubulpoor to Hoshungabad; I have added the coal and iron sites, and trust that the information may be acceptable.

J. H. Ousbley, Agent Gour. Genl. S. W. F.

2nd August, 1845.



A TWELFTH MEMOIR ON THE LAW OF STORMS IN INDIA; being the Storms of the Andaman Sea and Bay of Bengal, 9th to 14th November, 1844. By Henry Piddington.

The present memoir will scarcely need, at least for readers in India, any introduction; for the intense interest excited by the wrecks, and wonderfully providential escape of the troops and crew, of the True Briton and Runnymede, must yet be fresh in their minds. For those however in other countries who may honour it with a perusal, I may say that on the 9th November 1844, the barque Dido was dismasted in a hurricane in the Andaman sea, into which also the transport ships Briton from New South Wales, and Runnymede from England, both bound to Calcutta, the two together having in European troops and crews nearly 700 souls on board, were then running; and that being caught in it they were partially dismasted, and finally at about one in the morning of the 12th both ships were-wonderful to relate-thrown high and dry on the shore of the small or inner Andamans, the provisions of the one serving most opportunely for the support of the people of the other, and the whole being well able, by the troops, to defend themselves against the savages: They were taken off by assistance obtained from the British settlements on the Tenasserim Coast. I refer to the Summary at the conclusion for details, as to the highly instructive lesson in our science to be drawn from those storms; which in brief words amount to this-that the lives of a whole European Regiment were perilled to the utmost possible extent, short of destruction, by the ships not heaving to for six hours! As far as loss of life can be weighed or counted, the loss of a European Regiment in India would be equal to the loss of an average, or a first-rate, battle!

Abridged Log of the Steamer ROYAL SOVEREIGN, Capt. MARSHALL, from Penang to Calcutta.

On 9th November, 1844.—P.M. Light breeze SSE and clear weather. 8 P.M. abreast of Seyer Island, altered course to North. Midnight "fine steady breeze with drizzling rain."

10th November.—A.M. At 1 breeze increasing; at 2 heavy gale WNW. Ship hove to under balanced main-trysail. 4 A.M. gale in-



creasing, ship hove on her beam ends, stowed the trysail; 10 squally with heavy rain; 11 A.M. began to clear up. Noon, strong gale and clear weather. Distance run from noon 9th, 138 miles. At noon centre of St. Matthew's Island East § N., distant 20 miles, Lat. Obs. 9° 50′ N.

PM. Stopped steaming for repairs; course having been always NNW. At 2-30 heavy gale NNW.; by 8, wind SSW. hard gale and heavy squalls; all hands at the pumps. At midnight gale moderating, and the wind shifting to the SE. made all sail to get off the lee shore, course NNW.

11th November.—2 A.M. Squally with heavy rain. 4 A.M. clearing up, and fine breeze from the SE. noon Lat. Obs. 11° 6′ N. centre of Clara Island EbN. 4 N. distant 28 miles. Distance run from noon 10th to noon 11th, 58 miles.

Abridged Log of the Dutch Barque FATTEL HAIR. Capt. ——
from Batavia bound to Calcutta, reduced to civil time.

7th November, 1844.—Lat. noon 8° 48' N., Long. 96° 48' E. P.M, to midnight, light and variable winds from the NNE. and NE.

8th November.—AM. to noon, the same; wind NNE. and with light squalls. Noon Lat. 10° 3′ N. Long. 95° 56′ E. P.M. wind NbE. squally. By 7 P.M. ship had stood 14½′ to the EbN. and had then the wind NW. with squalls, increasing to midnight, up to which time she stood 16′ to the NNE.

9th November.—To 8 A.M. wind marked NW. and squally, 9 A.M. wind NNW. Noon increasing, preparing for bad weather. Lat. 10° 50′ N. Long. 96° 25′. Barometer marked as "still standing at 29.6. P.M.\* blowing fresh, increasing squalls and sea rising fast. Wind WNW. At 2 wind shifted to SW., kept away under the main top-sail and ran to 6 P.M. about 32 miles." Sea rising fast. At 6 P.M. wind SSW. increasing to a heavy gale, hove to. At midnight blowing furiously.

10th November.—A.M. Increasing, boats blown and washed away. Wind SE. and to noon the same; "wind coming round from East to

<sup>\*</sup> From this time the Log is in the form of a narrative.



due North. Barometer as before. P.M. wind increasing, Barometer beginning to fall at 1 o'clock." At 6 P.M. wind NNE. Barometer down to 28.5. At 9h. Barometer beginning to rise fast, a heavy squall, wind NW. At 9-30 gale beginning to moderate. Midnight, gale had moderated considerably.

11th November.—A.M. Wind SW. coming gradually round to the Southward, squalls continuing, but on the whole moderating. At II A.M. Barometer "up to fair again (about 30.00 in the usual Barometers), as usual." Noon, sea going down, Lat. 13° 6′ N. "N. B. this gale went round from North to SW. SE., East and North again twice."\* P.M. wind SSE. run from midnight to noon being 27 miles North.

On the two following days wind moderate from the SSE.

Abridged Log of the Schooner Clown, Capt. J. Talbert, from Penang towards Calcutta, reduced to civil time.

8th November, 1844.—2 A.M. a heavy squall from the North, and at noon squally appearances with winds variable from the North. Noon Lat. account 9° 58' N. Long. 96° 26' E. P.M. winds N. Easterly and Northerly with a heavy rising sea.

9th November.—Winds variable from the Northward and towards noon veering to the Westward. Noon "fresh gales with a tremendous heavy sea," Lat. account 10° 41' N. Long. 95° 56' E. P.M. wind westerly, hauling to the South with heavy sea throughout. 10 P.M. hove to; when up West and off NW. Wind therefore about SSW.

10th November.—A.M. increasing gale. 9 A.M. wind marked SSW. Noon strong gales, no position given. P.M. Strong gales S Westerly to midnight, when more moderate.†

11th November.—A.M. Wind Southerly, daylight out all reefs and fine. Noon, no position given. Wind S. Easterly; a 6-knot breeze. P.M. fine weather, wind S. Easterly 6 knots.

12th November.—Daylight saw Narcondam, bearing NbW. Noon Narcondam SWbS. 6 or 7 leagues. Winds SE. and ESE. 6 and 7 knots throughout.

<sup>\*</sup> The paragraphs marked by commas, are literal extracts.

<sup>†</sup> Vessel drifting to the N. Eastward, and storm moving to the Westward?



13th November.—Winds steady S. Easterly throughout. Noon Lat. account 15° 27' N., Long. 92° 37' E. Noon and P.M. squally with a heavy sea, 6 to 8 knots.

14th Nov.—S. Easterly breeze of 7 and 8 knots throughout. Noon Lat. account 17° 53' N., Long. 91° 00' E. P.M. to midnight wind N. Easterly.

15th Nov.—1 A.M. Lat. by star Rigel 19° 12' Wind NNE. Noon Lat. 19° 33', Long. 89° 45' E.

Extract from the private Journal of Commander Vyner, R. N. late of H. M. S. Wolf, passenger in the Brig Dido of Calcutta, from the Straits of Malacca to the Sandheads.

6th November, 1844.—A.M. Fine weather, light winds from the Northward. P.M. towards midnight, fresh breezes and rainy.

7th November.—4 A.M. More moderate; noon, light winds from the Northward and Eastward, sunset fresh breezes and hazy.

8th November. - 2 A.M. Squalls, with strong breezes and drizzling rain, which lasted throughout the day.

9th November .- A.M. Light breezes from the NNE., at 4 squally dirty weather, barometer going down fast, commenced reducing sail; at 8 wind increasing furled the courses, and close-reefed the top-sails, split the main top-sail in a squall, down royal yards; 9 a heavy squall, put before the wind, and unbent main top-sail; it was now blowing very hard, and a heavy turbulent sea running; at 9-20 the mainmast went close under the hounds, and fell forward in an oblique direction over the larboard bow, gale still increasing; at 9-30 the fore-topmast went by the board, and fell over the larboard bow. The ship was now in so lumbered a state from the wreck, that it was difficult to move without being hurt by some or other of the geer fetching way. From 9 to 11 the hurricane was at its height, and blew the whole time with unceasing violence; at 11 it suddenly fell calm, and in about 3 of an hour the gale again commenced from SW. and W. and blew as hard as before. Lat. at noon 11° 6' N., Long. 96° 12' E., at I P.M. the weather began to assume a better appearance; but the sea was running immensely high.



The wind at 3 P.M. began to veer to the Southward, and blew moderately. The Barometer did not fall below 29° 30' during the hurricane.

The wind from SE. continued until the 15th, when it ended in a very heavy gale, drawing round to SW. the violence of which lasted from 10 A.M. until 3-30 P.M. and here ended our disasters.

ARTHUR VYNER.

Abridged Log of the Brig Dido, Capt. Saunders, from Penang to Calcutta, civil time.

The Dido left Penang on the 4th November, 1844, and had variable, baffling, light winds from the North and between NE. and NW. so that by the 7th, at 8 A.M. she had the great Seyer Island bearing ENE., distance 24 miles, which would place her at the time in Lat. 8° 30′ N., Long. 97° 23′ E.

On the 8th November.—The same winds and weather A.M. At noon, no observation; P.M. light winds from NNE. to NW. with drizzling rain.

9th November.—Winds from NW., NNW., and at 8 A.M. North, with very dirty appearance. At 9, hard gales, obliging her to run to the South, the wind not marked but, as by Commander Vyner's note, NE. At 10, carried away mainmast head, and by noon when Lat. by account is 11° 6′ N., Long. 96° 12′ E. nothing but foremast and bowsprit standing. Shortly afterwards the wind is marked South.

10th November.—A.M. hard gales South to SSE. noon gale still keeping up and drawing to the SE. P.M. wind SE. 8 P.M. E. terrific gales and increasing, ship labouring dangerously, losing boats &c. &c., and in distress. No position given at noon; 10 P.M. gale decreasing a little; midnight wind SE.

11th November.—Gale moderating, wind SE. throughout, no observation. Clearing the wreck.

12th November.—A.M. moderate SE. breezes, at noon Lat. 13° 39' N. wind marked S. Easterly throughout.

13th November.—Wind marked SE, throughout, light breezes and fine. Noon Narcondam SbW. 30', Lat. 14° 04'.



14th November.—Wind SE., 5 and 6-knot breeze throughout. Noon Lat. 15° 07'; P.M. squally and heavy rain.

15th November.—A.M. wind SE. fresh breezes with heavy rain and cross confused sea. 8 A.M. to noon, wind marked South to SSW. and SW. 8 fresh gale and dirty weather. 1 to 8 P.M. wind marked West to NW. and West; at 8 gale increasing; hove to at 4 P.M.; 8 P.M. wind falling light, and sea with it; at midnight fine.

16th November.—Wind marked W. 4. A.M., when NW. weather marked fine; noon Lat. 17° 50' N. from which to midnight 19th calms; noon 19th Lat. 18° 58', Long. 89° 50' E.

Extract from the Log and Chart of the Ship Briton, Capt. Hall, from Sydney to Calcutta, with Troops on board, reduced to civil time.

Capt. Hall having favoured me both with his log-book and chart, I note here the position laid down upon the chart, as presenting a summary view of her track into the storm, and her drift in it according to Capt. Hall's estimate at the time.

	The state of the s				Lat.	N.		Long. E.
8th 1	November.				8°	25'		96° 55′
9th	31	Noon.		2 2014	9°	10'	* *	96° 30′
3)	31	6 р. м.			9°	43'		96° 12′
10th					110	00'		95° 12′
11 <i>th</i>	AND THE PERSON NAMED IN	•••			110	33'		94° 55′
12th		Would	have l	been in	, 12°	04'		93° 56′

On the 8th November.—The Briton was at noon in Lat. 8° 25' N. Long. 96° 55' E. or about abreast of the Seyer Islands, with very light baffling winds from the N. Eastward: and cloudy weather, which to midnight freshened gradually to a 4-knot breeze. Wind at 1 P.M. marked North, and for the rest of the Log, "variable from SW. to NW.

9th November.—1 A.M. course is marked WbN. to noon, the wind being from the NbW.; at 3.30, strong breezes. At noon, light and fine, Lat. Obs. 9° 10′ N., Long. 96° 30′ E. P.M. wind freshening fast from SW. and becoming SSW. at midnight, an 8-knot breeze; run 83′ NWbN. from noon. At 6 P.M. dark gloomy weather,



and Simplesometer 29.30. At midnight strong gale and squally, making preparations for bad weather.

NWbN. when "blowing terrifically with awful squalls," hove to with head to the NNW. 9 A.M. gale still increasing, took in the main top-sail and lashed a tarpaulin in the mizen rigging; 9-30 A.M. top-masts blown over the side, and all the sails from the yards. Simplesometer fell from 4 A.M. when at 29.20, to 28.10. At noon gale lulled off with showers of rain, and dark gloomy weather. Lat. by account 11° 1′ N., Long. 95° 12′ E. Simplesometer not rising. P.M. ship lying to with head to the WN. Westward, the gale having again come on from the SW. at 0.30 P.M., and blowing with more violence than ever. 2 P.M. terrific hurricane, boats blown to pieces. In the log, wind marked "variable from NE. to ESE.," at 11 P.M. head "up North off N.W." Midnight hurricane still increasing.

1.30 A.M. P.M. terrific hurricane. 2 P.M. saw a Barque about \( \frac{1}{4} \) of a mile to the Eastward with only her lower main and mizen masts standing.\*

At 10 P.M. hurricane lulled off with an awful swell, and dark gloomy weather. Simplesometer at 27.2. At 10-30 P.M. wind veered round to the NE. blowing with more violence than before, and starting the front of the poop. Throughout this sea log (from noon) ship is marked "Heading from SE. to North," and "Wind blowing all round the compass."

Fearful of the poop being blown away altogether, took the chronometers, sextants, charts, &c. below. Midnight hurricane still blowing terrifically.

12th November.—1h. 15m. A.M. struck, and at daylight the ship was found high and dry in a mangrove swamp; the Runnymede being close to them. Their Lat. was 12° 2′ N., Long. 93° 12′ 40° East. They were taken from the Islands by ships sent from Moulmein.

After the ship was on shore the remainder of the gale was from ENE., at which point it fell to fine weather. Capt. Hall estimates the rise of the sea, (the storm wave) on the shore as at least thirty feet! He, farther, does not estimate the ship's apparent average, drift (such



as seamen usually allow for in a gale) at more than four miles per hour, having once hove the log to ascertain it.

Abstracts of the Log and Chart of the Ship Runnymede, Captain Doutry, from England to Calcutta, with Troops on board, reduced to civil time.

As with the Briton's Log, I have thought it also best here to set down the Latitudes and Longitudes from the chart at first.

					Lat. N.		Long. E.
7th	November.	1.70	aris mile	Jug-gn	8° 36′	o county	96° 51'
8th	**				9° 32′	-44	96° 35′
9th	DEN STOP TO	7	De des	alapari.	9° 52′	1000	96° 27'
10th	er ander bene	OND	ACOM.	alle suppl	11° 6′	dating )	96° 0′

Friday, 8th November.—Heavy squalls with unsettled weather nearly through the whole 24 hours; winds variable NE. and N. Westerly; Lat. noon 9° 32′ N., 96° 35′ E. At 7 A.M. more moderate, sun obscure.

Saturday, 9th November.—Winds variable, at 5-30 wind NNW. squally, in 2nd reefs of the topsails; at 9-30 A.M. wind backing to the Westward, tacked to the Northward. Noon, sun obscure, Lat. 9° 52' N., Long. 96° 27' E. wind WSW. strong breeze; rainy and squally; P.M. increasing, making preparations for bad weather.

Sunday, 10th November.—Barometer falling, strong gale WSW. with heavy squalls; at 5 A.M. in courses and close-reefed the topsails. At 6 A.M. wind SW. blowing very heavily, in fore topsail and brought ship to the wind under close reefed main topsail and main trysail.

Noon no observation, Lat. by account 11° 6′ N., Long. 96° 0′ E. Hurricane of wind, Bar. 29.00, and falling. At 1 p.m., ship under main trysail only. At 1-30 p.m. the fore and main top-gallant masts were blown away. Wind South blowing very severely, the main trysail blown to atoms, ship under bare poles, and laying beautifully to the wind, with helm amidships and perfectly tight. The hurricane accompanied with a deluge of rain. At 4 p.m. wind SE. blowing terrifically, hatches all fastened down, starboard quarter boat washed away. At 6-30 p.m. nearly calm, wind backing to the SW. Sea went down. Bar. 28.45, kept ship away NbE. and got the top sails re-secured, portions of them having blown adrift. At 8 p.m. Wind SW. hollow



gusts; brought ship to wind on larboard tack. At 8-15 hurricane as heavy as before. At 8-30 the larboard quarter boat was torn from the davits and blown across the poop, carrying away the binnacle, and crushing the hen-coops on its passage. At 9 p.m. wind if possible increasing, the foremast broke into three pieces carrying away with it the jiboom, main and mizen top-masts, starboard cathead, and main yard, the main and mizen masts alone standing. At 10 p.m. the wind and rain so severe that the men could not hold on the poop, bailing the water from between decks which is forced down the hatches, but the ship is quite tight, and proving herself to be a fine sea boat. The pumps attended to, drawing out the water forced down hatches, mast coats, and top-sides forwards.

Monday, 11th November .- Hurricane equally severe; wind SE. Bar. 28.0; the gusts so terrific mixed with drift and rain, that no one could stand on deck; advantage was therefore taken of the lulls to drain the ship out and clear the wreck. The starboard bower anchor hanging only by the shank painter and the stock (iron) working into the ship's side, the chain was unshackled and the anchor cut away. Noon Lat. account 11° 6' N., Long. 95° 20' E. No observations since the 7th. Bar. apparently rose a little. Hurricane equally severe in the gusts, the ship perfectly unmanageable from her crippled state, but riding like a sea bird over a confused sea running apparently from every point of the compass. A large Barque with loss of top-masts and main yard drifted ahead of us, and a Brig was seen to leeward totally dismasted. At 4 P.M. Bar. fell to 27.70, and Cummin's mineral Simplesometer left the index tube. Hurricane blowing terrifically, the front of the poop to leeward, cabin door and sky-lights torn away, and expecting every moment the poop to be torn off her. The severity of the wind is beyond description, there is nothing to compare it to, for, unless present, no one could conceive the destructive power and weight of wind crushing every thing before it as if it were a metallic body." At I P.M. no abatement, every one, sailor and soldier, doing all in their power to keep the ship free of water, could not stand at the pumps; the water being principally in the 'tween decks it was bailed out by the soldiers as much as possible.

Tuesday, 12th November .- Midnight, hurricane equally severe, the

<sup>\*</sup> This is a very remarkable passage, which I have put in italics, as conveying an excellent idea of what the force of these terrific hurricanes is.



gusts most awful, and rudder gone. At 1-30 a.m. felt the ship strike, and considered the destruction of our lives, as well as ship, sealed; but it pleased Almighty God to decree otherwise, for although the ship filled up to the lower beams with water, she was thrown so high on the reef that the water became smooth, and the bilge pieces keeping her upright, she lay comparatively quiet. Not knowing our position, the ship being bilged, and fearful of her beating over the reef into deep water let go the larboard bower anchor and found the water leaving her. All hands fell asleep.

Day-break, hurricane breaking, much rain, wind ESE. Bar. rising rapidly until it stood at 29.45; we then, thank God, saw the loom of the shore to leeward, the ship being nearly dry abaft; on its clearing away we saw inside of us, up among the trees, a large barque with troops on board; one officer and twelve men were sent over the stern to communicate with her. At 7 a.m. the tide now rising, orders were given for the men to land at next low water, and if possible to get something cooked, as no fires could be kept in during the hurricane, the crew and troops merely having biscuit and a glass of spirits during the time it lasted. 3-30 pm. the tide having fallen sufficiently to wade on shore, ensign Dabernt returned on board, and stated the vessel in shore of us to be the "Briton," from Sydney, with three hundred and eleven men, thirty-four women, and fifty-one children, of H. M. 80th Regt. under the command of Major Bunbury, with a crew of thirty-six men, bound for Calcutta, and short of every thing.

N. B.—Captain Doutty informs me that the Thermometer at the lowest of the Barometer was at 84°, and that he considers the average drift of the vessel not to have exceeded three miles per hour. On shore nearly all the trees had fallen to the S. Westward, shewing that there the gale had been about NE. at its greatest height.

## Ships Blundell and Appolline. Between 9th and 18th November.

The Blundell was between the parallels of 2° and 12° North, and the meridians of 90° 32′ and 92° East, with nothing but calms and light airs.

Between the 9th and 19th.—The Appolline was in from Lat. 4° 48' to Lat. 15° 1' with light winds and fine weather. On the 12th only



in Lat. 8° 21' N. the Bar. fell from 29.2 to 29.00. Long. on that day not obtained.

Abstract translated from Log of the French Ship LA PRTITE NANCY, Captain Dufourg, from Bourdeaux to Calcutta, reduced to civil time.

On the 10th November, 1844 .- La Petite Nancy was in Lat. 8° 2' N.; Long. by Chro. East of Paris 89° 52' or of Greenwich 92° 12' Bar. F. 28.00 or 29.85 English\* Wind West, course NNE. 4' per hour; slight squalls and rain at times. P.M. fine, a slight swell from the North; at 9 P.M. wind SW. to SSW. to midnight.

11th November .- A.M. cloudy, and a swell from NE. and to noon variable winds SSW. to West and fine; ship running 7 to 9 knots to the NbW. At noon a heavy squall Lat. 9° 53' N., Long. P. 89° 49' G. 92° 09' Bar. F. 27.10 or 28.29 E. P.M. to midnight run 77' to the NNWrd.; winds West to SW. squally, and wind rising and falling -(brise inégale et variable) at 6 sharp lightning with thunder; midnight finer weather and strong head sea.

12th November .- A.M. to noon run 66 miles to NbW. and NNW. Wind WSW. to SSW. heavy sea. 9 A.M. heavy squall; noon Lat. 12° 251', Long. 88° 55' P. or 91° 15' E. Gr., Bar. 27.8 F. or 29.64 E. wind SSW. P.M. cloudy, wind WNW. to WSW. to 8 P.M. and SW. to SSW. to midnight. P.M. ship's run 41' North a little Easterly; at midnight finer weather, carrying a top-mast studding sail.

13th November .-- A.M. to noon run 102' to the NNW. Winds from WSW. to SSW. 9 AM. heavy squalls and head sea; noon Lat. account 14° 254' Long. 88° 84' P. 90° 284' G. Bar. 27.8 F.; 29.63 E. P.M. Run 1074' North a little Westerly. Winds SSW. to SW. and at midnight South. 9 P.M. sharp lightning, high irregular sea.

14th November .- A.M. to noon, made 1041, North to NNW. up to 10 A.M. when she broached to; winds to 4 A.M. South to SW., from 4 to 8 SSW. to South; 8 to 12 South, SSE. and a shift to SW. From 5 A.M. blowing heavily, preparing for bad weather. 10 A.M. Bar. 27.6. F. 29.41 E.; at 1 past 10 wind shifted to SW. heavy gale and sea, ship

<sup>\*</sup> I give the French Longitudes and Bar. heights with the reductions, to avoid oversights. The correction used is +2° 20' to bring the Long. to the meridian of Greenwich, and for the proportional scales of the Bars. 1000 E.: 1066 Fr.

<sup>+</sup> The word is sauté,' which is our "shifted."



broached to, (the rudder head it was found afterwards had split) and was laid on her beam-ends, mainsail main top-sail, boats, &c., blown or being swept away, the sea being up to the hatchways. At 10-45 hurricane increasing, and vessel always on her beam-ends, cut away the mizen-mast. Bar. falling to 26.7 F. 28.46 E. At 11 Am. cut away top-masts, when the ship righted a little; Bar. having been at 10 Am. 27.6 F. 29.41 E.; at 10h. 40m. 27.00 F. 28.78 E.; and at 10h. 50m. 26.7 F. 28.46 E. (a fall of nearly an inch in two hours! and this note is from Captain Dufourg's private memorandum), Lat. by account at noon was 15° 47′ N., Long. 88° 12′ P. 90° 32′ G. At 3 P.M. the wind shifted in a heavy gust with torrents of rain to the SE. with the same violence,\* and being then to starboard, righted the vessel completely; but she did not lie over to port, which confirmed the opinion of the Captain and officers that the cargo had shifted.

At half-past 3 the wind suddenly fell, but the Barometer always remaining at 26.7 F. (28.46 E.) a renewal of the storm was expected. At 5 P.M. the hurricane began again more violent than before, from the SW. and continued till 9 PM. the ship always heeling to starboard. From 9 P.M. it was moderating.

15th November.—P.M. Weather moderating fast; at day-light saving and clearing the wreck, Lat. noon by account 16° 40′ N. Long. P. 88° 37′ E., G. 90.57 E.; Bar. 27.00 F. 28.78 E. P.M. moderating to light airs SW. and S. and heavy sea continuing.

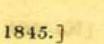
16th November. — Daylight calm with a heavy sea, saving and clearing wreck. Noon Lat. Obs. 17° 00′ N., Long. Obs. 88° 49′ E. P. 91° 09′ E. Bar. 27.8 F. 29.63 E. to midnight calm.

17th November.—Calms which continued to 5 A.M. on the 19th November. Noon Lat. Obs. 17° 6′ N. Lon. Obs. 88° 58′ F. 91° 18′ G. P.M. Bar. 28.00 E. or 29.85 E.

The ship made no water, and arrived safely at the Pilot station on the 25th. November.

I now give a tabular view of the positions of the ships on different days beginning with the 9th, as on the 8th we may say that there was no bad weather, the *Clown* having it only a little squally, all the others with light baffling winds and slight squalls from the North.

<sup>\*</sup> The ship having drifted to the NE. and the hurricane passed on to the WNWestward.



## Twelfth Memoir on the Law of Storms in India.

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Serie ()	Olive for						
the Andaman Sea and Bay of Bengal 9th to 11th of November, 1844.	Remarks.	track, the source of the sourc	beavy gale; midnight hurri- cane.	IO P. M. Wind about SS W.  By 11 A.M. dismasted, 11 A.M. calm, and at noon hurricane	from S.W.  P.M. Freshening fast from S.W. and SS.W. at midnight. Making preparations for bad weather.	10 P.M. gale decreasing; mift- night, wind N.E.	I A.M. hove to. P.M. hurricane NE. to ESE., midnight in- creasing.
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ngal 9	Simp.	digit element or dealer i	est or joul.	antas basa - pil Jan	6 P.M. 29.30		29.20to
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Tabular View of the Winds and Weather in the	Wind and Weather.	Steamer Royal Sove- reign, Islands, Islands,	Variable, and at noon veering to westward, fresh gale, and tremendous sea.	and NNW. dirty; 9 a.m. hard gales NE	Light and fine weather, 6 P.M WSW. Rainy and squally,	Hard gale SEbS. P.M. SE terrific gale,	P.M. renewed,
ar View of the Wi	Name of Place or Ship.	Steamer Royal Sove- reign, I	Schooner Clown,	Brig Dido,	Briton, Itunnymede,	op	Briton,
Tabul	Date.	Noon. 9 Nov.				Noon 10 Nov.	



	370	Twelft	h Mem	oir on the	Law of	Storm	s in India	. [N	0. 161
	Remarks.	Ship hove to,		Noon; centre St. Matthew's Is-	9 p.m. Barometer beginning to		10 P. M. another lull, and renewed again from the N.E. 2 P.M. saw the Runnymede. At 1.15 A.M.	At 2 P.M. saw Briton. At 1.30 A.M. of 12th struck.	At midnight finer, but strong head sea.
	Ther.	• :		:			:	æ	:
	Simp.	:		:	:		10р.м.	:	:
The second second	Barometer.	29.00 28 45 6 P.N.	29.85	:	6 Р.М.		:	27.70	28.89
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A CONTRACTOR OF THE PARTY OF TH	Wind and Weather.	Hurricane SW. At 2-30 S. 4 P.M. SE. 6-30 nearly calm, 8-15 hurricane, SW.	La Petite Nancy, West slight squalls and rain, veering to S.W. at midnight,	2 to 10 A.M. heavy gale WNW. at 11 clearing up, noon strong gale, 2-30 P.M. heavy gale NNW. by 8 SSW.	Barque Fattel Hair, A.M. SE. Noon, North; 6 P.M. NNW. 9 NW. mid-i	gales; P.M. SWesterly, at midnight more moderate,	SE. gale throughout,	Hurricane SE.	La Petite Nancy,* West to SW. rising and fall- 9 53 92 09 28.89 At midnight finer, but stron sea.
	Name of Place or Ship.	Runnymede,	La Petite Nancy,	reign, 2	Barque Fattel Hair,	Schooner Clown,	Dido, Briton,	Runnymede,	La Peute Nancy,*
	ie.	on. Nov.					Nov.		

\* For the dismasting of this ship on the 14th, and the connection between her storm and the Dido's second bad weather, see the Summary.



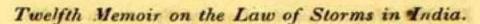
Date.	Name of Place or Ship.	Wind and Weather.	Lat.	Long.	Barometer, Simp. Ther.	Simp.	Ther.	Remarks.
Noon.	Noon. Steamer Royal Sove-	re. Fine weather, and breeze from SE	911	:		- tu i	1= :	Centre Clera Island EbN. § N.
	Fattel Hair,	Noon. Wind Southerly, and weather becoming fair,	13 6	:		:	:	Il A.M. Barometer at "fair,"
	Schooner Clown,	Noon. Fine, and wind S. East- erly and 6-knot breeze,						

1845.]

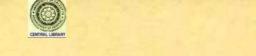


## SUMMARY.

I have already remarked that on the 8th of November the weather was fine for all the ships, none of which were to the North of Lat. 10°, and we find on the 9th that the Dido was dismasted about the centre of the hurricane, at 11 A.M. on that day, and by noon the calm centre had passed her, and she was again in a hurricane at SW. This vessel's position therefore, and we have it most accurately fixed, (having fortunately in Commander Vyner, R. N. who was passenger on board of her, an independent observer, who would make every allowance in his notes for what might escape the Captain and officers,) gives us the place of the centre of the storm on that day as being a little to the N. West of her. The storm circle at this time must have been of extremely small extent, for it had but just reached the Clown, which vessel was only twenty miles distant from the Dido, which would make the circle less than 40 miles in diameter; but the Clown had the usual warning of a rapidly veering wind, and a tremendous heavy sea, and the tornado, for so we might almost call it for its size, was fortunately moving rapidly on, so that by her heaving to at night with the SSW. gale she fortunately escaped running into the worst part of the tempest. I have thus given the circle for this day a diameter of sixty miles only, which will just include the Clown. The hurricane for this day indeed remarkably resembles that of the Cashmere Merchant, described in my Second Memoir, Journal Asiatic Society, Vol. IX, p. 433, which also occurred near the Preparis, and some of those which (see Tenth Memoir, Journal Asiatic Society, Vol. XIII, page 113,) also arise off the coast For the centre of the storm circle on the 10th, we have the estimated position of the Briton, which ship after running up 121 miles to the NWbN. the exact course upon which she should have CHASED the hurricane if she had meant to do so, found herself obliged, at 6 A.M. to heave to close to the centre, into which she had drifted at noon; having sunk her Simplesometer from 29.20 at 4 A.M. to 28.30 at 6, her estimated position at noon being 11° 1' N. 95° 12' E. and the lull occurring just at this time. The Runnymede, which vessel had also been tempted by the treacherous fair wind, and run up 80 miles to the NWbN. though with a falling Barometer, was about fifty miles to the



1845.7



Eastward of her, and had it also blowing a hurricane from about South, judging from the log abstract, in which it is made to be SW. at 1. A.M. or after midnight up to Noon, and South at 2h. 30' P.M. The Dido whose exact position this day I could not obtain, has a hurricane at SE. being in the NE. quadrant. The hurricane had thus no doubt extended on this day from a circle of 60 miles to one of 130, and apparently was still doing so, for the Fattel Hair, farther to the Eastward than the Runnymede, seems to have ran up skirting the SE. quadrant of the storm and to have had the true storm wind at SW. when it "shifted at 2 P.M." to that point. The Royal Sovereign, close in with the land, appears to have also had a separate small storm veering with her in a few hours, but not of any very great consequence, or at all connected with the Briton's and Runnymede's; though, as I shall subsequently shew, it may probably have been so with the remarkable double veering of the Fattel Hair's winds. 11th we have the above two ships always lying to and drifting, as well as they could estimate in the hurricane, to the points marked on the charts, which are about forty miles NNW. and SSE. of each other, but there is no doubt that the ships saw each other at 2 P.M. on this day; the Runnymede also saw a brig, but this was not the Dido, which vessel had her foremast standing, and was not at this time in the heart of the hurricane.\* We shall also find that the two ships Briton and Runnymede struck just after midnight of the 11th-12th, (or between 1 and 2 in the morning of the 12th) so that they must have been now much farther to the Eastward than they supposed themselves. We have no fixed positions of any other ships also from which to guide us as to the extent of the hurricane circle on this day, and in short our only datum is that both ships having the wind to the Eastward, i. e. the Briton between NE. and ESE. and the Runnymede about SE., both must have finally drifted over to the Northern quadrants of the hurricane, though always close to its centre.

We must then therefore consider that (throwing away the odd hour or two after midnight of the 11th-12th) the hurticane travelled, and carried the ships with it from the place of our centre on the 10th, to

<sup>\*</sup> Probably one of the native coasting craft which run across the Bay to the ports of the Straits.



near that at which the ships were wrecked on the inner Andamans as marked; which is a distance of about 140 miles in 36 hours, or from noon of 10th to midnight 11th-12th, and we can only estimate this also on a direct line. Hence by noon of the 11th then, or in 24 hours, it would then have travelled two-thirds of this distance, at which point I have placed its centre for the 11th, which the reader will observe is wholly irrespective of the supposed positions of the ships as marked on their charts. I have made a dotted line to shew what may have been their drift, if we have, as I presume, approached the true place of the centre of the storm at noon on the 11th.

The Petite Nancy, which on this day was opposite to the opening between the Little Andaman and Nicobars, appears, though at 150 miles from the centre, as we have laid it down, to have felt some of the effects of the storm, for we observe that with a NE. sea and squally weather, her Barometer had fallen nearly an inch! (0.96) in the 24 hours from the 10th. And that she had the rising and falling wind which I have so often pointed out as indicating the approach or vicinity of a storm. I defer the consideration of the storm which dismasted her to its proper place in the order of time. Between 1 and 2 A.M. on the 12th, the Runnymede and Briton were both thrown high and dry on shore on the inner Andamans, by a gale between ENE. and East; and Captain Doutty of the Runnymede informs me that most of the trees had fallen to the S. Westward, showing clearly that the centre of the Hurricane had passed to the South of this spot. The storm wave I shall presently consider; but return now to the Royal Sovereign on the opposite Coast.

We find that within a short distance of the Islands fronting the coast, on the 10th November, the Royal Sovereign had at 2 A.M. a heavy gale at WNW. when the vessel was hove to, and at 4 A.M. she was on her beam ends. At 11 it began to clear up, and noon was but a strong gale and clear weather.

Now from 2 AM. to noon are 10 hours, and in this time a Steamer in such weather, when hove to, might drift at least fifteen or twenty miles to leeward, though keeping to with her steam; and the wind being to the Northward of West she might drift out of the edge of the storm circle, or as she seems afterwards to have steamed on to the NNW. have again ran into the vortex on its western side if it was one;



so that the gale was renewed with her at NNW. veering, as she was close to the centre,\* by 8 P.M. to SSW. and moderating at midnight of this day, when she was about in Lat. 10° 20' N. and at noon on the 11th it was fine.

We see, first, by the chart that on the 9th, the Sovereign was only abreast of the Seyers in 8° 30' N., and on the 10th the whole of the ships, except the Fattel Hair, were at nearly two degrees distant from her; the Runnymede, the nearest of them, being at 110 miles off, and both the Runnymede and the Briton close to the centre of their storms, with which therefore the Royal Sovereign's has no sort of connection; for if it had, it must have been a steady gale from WSW.

It was then an independent (and perhaps an imperfectly formed) vortex, and we have now to see whether it had any connection with the double veering of the Fattel Hair's storm.

This vessel, we have seen, hove to at 6 P.M. on the 9th, being then about in Lat. 11° 20' N., Long. 96° 37' E.+ with a gale at SSW., and this, by the way, proves that up to that time the centre of the principal, or great storm, had really travelled about West, as we formerly deduced. The storm was also probably expanding at this time.

The Fattel Hair, gradually drifted up with the SSW. gale and sea, so as at 1 A.M. or in 7 hours, when her drift might have been about twenty-five miles North, to have the wind SE. and at noon on the 10th the wind was " coming round from East to due North!" with her so that, as she could not be now near the centre of the principal (Briton Dido and Runnymede's Hurricane,) she had been overtaken by another one, or another one had formed with her, for we can easily conceive how a S. Easterly gale may by the effect of a new vortex come round, as is here described. Her position on this day at noon is not given, but I take it to have been-as she must have drifted to the NW. West, and even WSW. with the winds given-about Lat. 12° 03' N. Long. 96° 19' E. and as she had the wind North or Northerly at noon, she was moreover now to the Westward of the centre

<sup>\*</sup> Or it may be that it was only just forming, and interrupted on one side by the neighbouring land? The log extract sent me is not very clearly detailed.

<sup>†</sup> This is deduced from her Latitude and Longitude at Noon, and her "keeping away (which I take to have been about NNE.) 32 miles," before she hove to.



of this new vortex, which seems I think to be evidently one thrown off from the great one, of which the centre as we have placed it for this day was now at ninety miles to the SW. of the Fattel Hair, and we cannot be very far wrong in her position or in its place also. If she had had any part of the great storm, she must have had a steady gale from the S. Eastward.

This is an instance then of a smaller and less intense vortex following, or being thrown off from, a large one, and it was certainly much smaller, for we find that with the wind North at Noon on the 10th, the Fattel Hair had it at a little past midnight at SW. or it had veered 12 points in, say, 13 hours, and was then moderating. I have thus marked it as a small circle, only to shew its independence of the main storm. I need not add that it had no connection with the Royal Sovereign's storms.

We have no farther data for tracing this storm within the Islands, and we have now to consider if it could have been the storm which dismasted the Petite Nancy.

I think decidedly not. We see that, presuming that it was travelling on from the 10th, and not breaking up of itself there, it must, to have reached the Petite Nancy, on the 11th first, have run faster than the Fattel Hair, which it did, since it left her with the winds from SW. at midnight 10th-11th, to SSE. at noon of the 11th, and then have overtaken the Dido again with another storm, from NE. or NW. striking her with its Western quadrants. The Dido had her second storm only on the 15th from the SE. and SW. so that she was skirting the Eastern edge of a storm already to the Westward of her. this makes it probable that the Petite Nancy's storm was rather, if not a separate storm also, the Briton and Runnymede's, which must have been upon the Great Andaman, on the 12th, and probably between that day, and the 14th, forced its way over the mountain chains of that island, and travelled up or re-formed itself in the Bay.\* The winds which the Petite Nancy had on the 12th when she was at 90 miles only from the body of the Great Andaman, and but a little to the Northward of the wrecked ships, were

<sup>\*</sup> For an example of a storm forcing its way over high land and re-forming again, see Journal, Vol. XII. Eighth Memoir.



from the WSW. to SSW. and fine enough to allow her to carry a top-mast studding sail at midnight, while, had any effect of the storm been felt by her at this time, it must have been in Northerly or N. Westerly winds. On the 13th she had the winds from WSW. to SSW. and finally at midnight South, with sharp lightning at 9 p.m. and irregular sea, with a falling barometer about this time, showing that she was now just running into the vortex.

Her hurricane appears to have been of small extent, or to have been moving rapidly to the WNW. for it lasted with her not more than from 5 A.M. to about 10 P.M., or 17 hours, during five of which, from 5 to 10 A.M. when she broached to, she was running into, and with it, and we have no data for tracing it any farther. The circumstance of its being followed by so many days of dead calm is very remarkable, and has not hitherto occurred in any of the storms which we have traced in the Bay of Bengal. We must now go back to the Runnymede and Briton to trace from their logs and positions so far as we can do so the effect of the storm wave.

We find that on the 18th, when the ships, though then in the hurricane, had not been so long enough to make their positions very uncertain they were at 70 miles distance, and about East and West of each other. Taking the mean of this to be an average position, and the two ships as one, since they were both cast on shore at the same place, they will then be at this time,—noon of the 10th,—in Lat. 11° 4′ N. Long. 95° 38′; and the spot on which they were wrecked bearing from them about WNW. 150 miles, which represents their drift made good, from noon of the 10th to about 1h. 30m. A.M. on the 12th, or in 37½ hours.

Now Capt. Hall of the Briton estimates his drift at not more than four miles per hour, and Capt. Doutty of the Runnymede his at three miles. Their mean drift (as we have taken the mean positions) would then be 3½ miles per hour, which for the 37½ hours gives a distance of 130 miles, and leaves only 20 miles to be accounted for as the effect of the storm wave, which is therefore quite trifling.

Its rise on the shore, which must have been immense to throw the ships so high, has already been noted. It would appear that all ships when blown over so far as to lay with their lee gunwales in the water



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drift much more rapidly to leeward than is supposed, and seamen in these extreme cases would do well to make large allowances, which will at least place them on their guard.\*

The fact that in so narrow a sea as that between the Andamans and the Mergui Coast, which is only five degrees, or 300 miles across from Islands to Islands, a true rotatory storm of such terrific violence and yet of such small extent may arise, is also new and most instructive, and it is equally remarkable to find it making about the average track from ESE. to WNW. and travelling at about the average rate of the slow classes of our hurricanes in the Bay. It would have been of high interest to have ascertained if the storm was formed in the China sea, and crossed over the Peninsula, which is here only sixty miles broad, and so low that there is almost a water communication,† or if any signs of its formation were noted on shore; but unfortunately the British territory terminates at the mouth of the Pak-Chan river, in Lat. 10° 00′ North, and the first European residents on the coast are to be found only at Mergui, two and a half degrees to the North of that point.

#### CONCLUSION.

If we had endeavoured to invent the most instructive lesson we could have devised for shewing the truth and utility of the Law of Storms, we could scarcely have imagined one better calculated for that purpose than this. The reader has only first to satisfy himself that the two storm circles of the 9th and 10th must have been nearly what they appear in the chart, and then to follow with his eye the tracks of the Petite Nancy, Runnymede and Briton, noticing what is said at

<sup>\*</sup> As to the average rate of motion and track of the storm, we have its centre well marked at noon on the 9th, from which to midnight of the 11th-12th are 48 hours, and the distance from the centre of the 9th to the place of the wrecks, is about 184 miles; or not quite 4 miles per hour, on a course of, from point to point, N. 72° West. It however travelled from the 9th to the 10th not more than 60 miles, and thus did not make three miles per hour on that day.

<sup>†</sup> It has been roughly surveyed by Capt. Tremenheere, B.E. who found the greatest elevation to be about 450 feet; Journal Asiatic Society, Vol. XII, p. 520.



pp. 363 and 364 of their falling Barometers and increasing bad weather, to be clearly satisfied that this was clearly a case in which the last two ships in a narrow sea, with a hurricane crossing their track, and in the face of every indication ran headlong into it; being tempted no doubt by the fair Westerly and S. Westerly winds, heaving or broaching to only when they could run no longer. Both commanders, indeed, when I had, by means of the transparent horn cards in my little publication, "The Horn Book of Storms," shewn them upon their own charts that they did so, fully agreed with me that had they better understood their position between the 9th and 10th they should not have run on as they did, but have hove to.

Now when we recollect what the value of the two wrecked ships with two-thirds of a European regiment on board might have been in India, had they been totally lost in time of war,—if there is any money value to be set on human life—it is impossible I think to rate too highly the lesson it conveys, severe as it must have been to the sufferers.

And finally when we bear in mind that this same predicament may yet occur to a whole fleet, either in the East or the West Indies,\* or in any part of the world, and that a defeat from the elements may be as disastrous as one from the enemy, and by the failure of succours, involve even farther losses, I shall not I trust be thought over-earnest when I urge again on every man the intense importance of this science to Englishmen, above all other nations of the globe; and this storm is also in another light an undoubted proof of it; occurring as it has done in a sea where such hurricanes were before unknown!

<sup>•</sup> It did occur in the West Indies to the fleet under Admiral Rowley, and to that under the Spanish Admiral, Solano, in 1788. See Col. Reid's Work, 2nd Edition.



Some account of the Hill Tribes in the interior of the District of Chittagong, in a letter to the Secretary of the Asiatic Society. By the Rev. M. Barbe, Missionary.

MY DEAR SIR, - During my late trip to Chittagong I took advantage of the favourable state of the weather to visit the Hill tribes of that district, as a few months before I was amongst the Kookies I visited in my last trip the Bunzoo tribe. Having in my account of the Kookies described the banks of Chittagong river, I will not repeat here what has been mentioned before. I stopped one night at Rangunia, which is about 25 miles from Chittagong; and when there, I engaged the services of my old guide: this man had been of great use to me when I visited the Kookies. Having spent part of his life amongst the hill tribes, he is well acquainted with their habits; and I think that a person who is not a Government officer accompanied by him, might go with security to any of their villages. This Burman is a sportsman by profession, and consequently he can give correct information respecting the different species of animals which are found on those hills; but the characteristic custom of his nation being not to contradict persons whom they consider superior to them, when any question is put, the answer is not to be anticipated, because in every circumstance he will approve of it; so the only way to get the truth is to let him answer by himself, deducting of course something on account of exaggerations to which they are very much inclined. On the evening of my departure from Rangunia, I reached the east part of Sitacra hill, which is at two tides from Chittagong, and slept in a small village situated on the top of a hill, elevated from three to four hundred feet above the level of the river. The house in which I took up my abode belonged to an Arracanese who, having spent some years at Rangoon, spoke Burmese passably. -The entrance to the house, which was elevated nine feet from the ground, was a spacious uncovered verandah; the building had several rooms: the hill being very steep on one side, the house was raised about fifteen feet on that side, and supported only by bamboos of small size. The old man received me with great kindness. He had with him eight children, one only being married. He said he was very anxious to see all his boys established; but as it was the custom to expend about 100 rupees for a bride, his means did not allow

him to marry them. Seeing the respect paid to the venerable old man and to his consort, reminded me of the life of the patriarchs.

On the morning we had a storm and heavy rain till 8 o'clock, so I could not begin the ascent of Sitacra hill before 10 o'clock; at that time the thermometer was 82°. Ascending the hill I was scorched by the rays of the sun, but the effect of the elevation was marked on the temperature; when I reached the top of the hill it was past II o'clock. I had the pleasure to enjoy a refreshing breeze; and at 12 o'clock, the thermometer was only 78°. Sitacra is one of the highest hills of the chain, which extends from the east to the north-east; its elevation is from twelve to fifteen hundred feet above the level of the river, and it affords the most magnificent sight I have ever witnessed. The view was extensive and charming-the sea to the S.W.; to the W., Chittagong and Sitacoond; to the N. W. the Rance house, situated in a vast plain covered with water; Chittagong river flowing in serpentine lines, and to the E. and N. E. a succession of peaks more or less elevated, clothed with vegetation, and appearing to draw closer together as they disappeared. The horizon was an immense circle; and although the scenery was diversified, a single place could not be seen stripped of vegetation; the most elevated spots were covered with shrubs, the hills have been crowned with Jarool and Toon trees, but they have been cut down by the different tribes, when they have cleared the ground; all those places have been cultivated, with the exception of the narrow valleys which lie between the ridges of the hills. The humidity occasioned by five or six months of rain produces a vegetation full of vigour; from the edge of the water to the top of the highest hill, the flourishing aspect of nature is a proof of the fertility of the land. Few of those hills are without springs. The air appears to be very good.

People living on those hills appear to be healthy and strong. I saw some persons above 70 years old; and I was told that there was a woman whose age was 100 years. Last year many persons died of cholera. This disease was unknown to them fifteen years ago. Fever is the general complaint. I admired the idea of the Kookies, who believe that the greatest happiness of man after his death, consists in being placed on the summit of the highest hill to enjoy the pleasure of seeing the beauties of nature. The existence of a



Supreme Being who is to give a spiritual reward being above their conception, how can they imagine a greater happiness than the view of the most beautiful scenery?

Following the edge of the hill to the S. E., I passed through a village situated on the top of another hill, about 200 feet lower than Sitacra, whose inhabitants were Arracanese. I saw some Oolock and other monkeys on a high jungly jack tree, whose fruits are smaller than the common jack; they are good to eat, but have an acid taste: this tree grows very large; the wood is of a beautiful yellow color; the Burmese use it in building their boats:

When I reached the banks of the river it was four o'clock, the thermometer being at that time 88°; there I met several persons, who were waiting for me to get medicine: they begged of me to go to their village; but as it was too much out of my way, I declined their invitation. Some of them wished to accompany me; but as I knew that they were busy in sowing their crops, I would not accept their offer. These Arracanese are very hospitable, kind, and disinterested; I have been several times in their villages. They have accompanied me in my excursions, and I could never prevail on them to accept any reward for their trouble, nor for the different articles furnished during my stay amongst them. On the following morning I started from my boat, and crossed a plain for one hour in a southerly direction following a small path, and crossing several times a small stream and then ascended a hill elevated from three to four hundred feet above the level of the river, following the edge of that hill in an easterly direction. I saw at the distance of three or four miles the Bunzoo houses, situated on top of another hill called the Diamond mine; on another hill thirty or forty persons were busy in sowing paddy and cotton. It is the custom that all the people of the same village join in assisting one another for that purpose. When I reached the village it was past 10 o'clock, and the sun at that time began to be very powerful; the houses nearest to the creek were inhabited by Arracanese. The Bunzoo dwellings were on the summit of the hill; and hearing that no Bunzoo was at home, I went to the house of an Arracanese whose wife was from Tippera; she dressed like the Burmese women do, spoke a little of that language, and her features so much resembled those of the Burmese, that I took her for one of that nation. She offered me some



fruit, and a bottle of liquor distilled from rice; some time after, the house was filled with women and children: being the first European they had ever seen, their curiosity did not surprise me. In the evening the men came from their work, and the most respectable Bunzoo of the village asked me to take up my abode in his house. His dwelling being in a higher situation, I accepted with pleasure his offer; the house was elevated three or four feet from the ground, being twenty feet broad and eighty or ninety feet long, without any partition; to one side was a small room which he offered me. At the entrance of the house the heads of hogs, deer, and other animals killed in his hunting excursions were kept; a large fire-place was in the centre of the dwelling. Conical baskets, earthenware, and mats were all the furniture. The principal post of the house is considered by them sacred, and the head of the family is the only person who can touch it; should any other person do the same he becomes the slave of the master of the house. This Bunzoo was fifty-six years old, he stood five feet ten inches, and was well built; his hair was long, and tied after the fashion of the Burmese; he had projecting cheek bones, flat visage, scanty beard, and was of dark yellow complexion; his dress was a piece of cloth, one foot broad, round his loins. His wife and daughters were of middle size, but very stout; they had the Burmese dress, but the cloth was red and black; their breast was covered with another piece of cloth of the same color, one cubit broad and four feet long. His family consisted of four boys and three girls; he had two children from eight to ten years old, with black eyes, small lips, and displaying great intelligence. The other Bunzoos which I saw were not so tall as the men before mentioned, and the average is, I believe, from five feet two inches, to six inches. The women are, generally speaking, much stouter than the men. This tribe appeared to be grave and silent; this is remarkable in children, they shew no petulance, and partake of the character of their parents; six or seven of them were with me a part of the evening, and to my great surprise they paid as much attention to the conversation, as if the subject had been adapted to their intelligence. I was particularly struck with their civility, no one took a thing offered to him without previously saluting by joining his hands towards the person who gave, and the same ceremony was repeated by the donor: men, women, and children do the same; when spirits is offered,



the women dip their finger in the liquor, and then salute as before stated.

The Bunzoo food consists of rice, fruit, roots, vegetables, young leaves of trees, blochein, (which is prepared by the Mugs of Rangunia of shrimps salted and pounded,) and deer, hogs, fowls and goats. The Bunzoos admit the existence of a Supreme Being whom they do not worship, the reason being that "they have never heard about him nor seen him;" but it is not the same with the devil, whom they consider as the cause of all evil,-to him they attribute their diseases, the failure of their crops, &c., and to gain his favour they offer him pigs, goats, fowls, &c.; they believe in a place of torment, but what are the offences that deserve such punishment they don't know; they think that the greatest part of the dead come again into the world to animate other bodies, and persons who have been fortunate enough to secure the head of many wild animals are entitled to be rewarded in their future life: this is the reason for which they keep with the greatest care the heads of animals slain by them. The Kookies burn the dead, the Bunzoos do not. They hollow a piece of wood, deposit the dead in it, and bury it in the summit of some hill, putting in the same grave the heads of animals killed by them, spears, cloth, and money belonging to the deceased. On the Tenasserim coast the Kareans burn the dead, and keep one of the bones of the head for one year, and after feasting for some days, they take it with all the articles belonging to the deceased, on a hill where all articles are deposited which belonged to persons of the same caste. The Bunzoos never marry to persons of another tribe, and a wedding never takes place without spending much money. The father and mother of the young man apply for the bride, which is never promised unless she give her consent; should the young man be without parents the head of the village is to ask the bride's hand, the relations of the lady ask then a sum of money, from one hundred to one hundred and fifty rupees; if the young man has that money he pays it immediately; but if he has not, the bride's relations agree to receive it by instalments. The day of marriage being fixed, a feast is given to the relations and friends, and the young woman is taken by them to the house of the bridegroom, and without any further ceremony, the maid becomes wife. They have but one wife, and if she leaves her



lord's house without a just cause, her relations are obliged to give back the money received, but should the husband send her away he has no more claim. Should the Bunzoo, in his warlike excursions, capture any young women he generally sells them, but if he cannot he has them under his keeping without being considered his wives; their consorts are generally well treated, but they are far from paying them the same attention as the civilized people do. One of them asked me in the most serious manner if it was true, "that Europeans worshipped their wives." The chain of hills which separates Chittagong and the Tippera district from the Birman Empire is inhabited by a number of tribes differing little in appearance, but partly in habits and language; but the features of those tribes, particularly the flatness of the occipital bone, resemble the Burmese so much that I am not far from believing they have a common origin, and if the Bunzoos are not so strongly built, and so well made as the Burmese, it might be in consequence of their mode of living, which, as it has been observed by Cuvier, in few generations will deteriorate the physical character of the highest races of mankind. The Kookies appear to be the most numerous of all tribes; to the N. E. of Chittagong, not far from Casalon which is a branch of the Chittagong river is one of their kings, who rules over six or seven thousand houses; he has on his hill ponies, cows, &c. How far he takes advantage of his authority, I have not been able to ascertain. The Bunzoo tribe is chiefly centered towards the S. E.; having no annals of their own it is impossible to trace their origin, and to warrant an opinion on the subject, requires more information than I could get. According to them, formerly they were more powerful and numerous than they are now. The Kookies taking advantage of their number, subjected them to their yoke. Their language appears very poor, they have no word to express the days of the week, but borrow them from the Burmese. Their dialect contains many Kookie and Burmese words. They compute their years as the Kookies do by the number of their crops. Persons who build theories on the analogies of language, will find at the end of this letter a small vocabulary which will assist them. The Bunzoos distil from rice a fermented liquor, the drinking of which seems to afford them great They pour into a cup the spirit; which goes round the company, every person, not excepting the women and children, taking a draught, and they never separate till the liquor is finished; but how far

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drunkenness prevails, or if they are addicted to intoxication, is more The Arracanese who live on the hills pay from three to four rupees of land-tax a year, but the Kookies and Bunzoo are rentfree; and should they be compelled to pay, being a wandering tribe free as birds, they would immediately leave their residence, and retire to the interior of mountains where no person could molest them. They are certainly the most independent people that can be seen: a no made life is for them the greatest happiness, and, as children of nature, their wants are few; and these wants they can supply in any place. They venture on hunting excursions when their agricultural labors are finished; spears and bows are their principal arms, and their dogs are always their faithful companions. Their exertions and agricultural labors are directed only to the growth of articles necessary for their subsistence, as paddy, yams, plantains, melons, tobacco, cotton, &c. They manufacture their own cloth, and exchange the cotton they do not require for salt, earthenware, &c. They plant a species of indigo growing about two feet high, the leaves which are large are employed to dye their clothes, which is done in the following way :- Taking a certain quantity of leaves, they put them in an earthenware vessel; when the water boils they dip in it the thread, mixing with it an extract of an astringent bark; they dry then the thread, and they repeat twice again the same process. The jungle affords them roots of trees or shrubs to dye green, yellow, &c. : salt is the only thing which they procure with some difficulty, but the hills contain several springs of salt water; two of those are found at Sitacoond, and there is another one in a creek on the opposite side of Sitacra. The greatest part of salt used by people living on the banks of the river was manufactured formerly there, and the spring is so impregnated with salt that it gives in weight half the quantity of the salted water; some of the tribes by burning trees procure an alkali, which supplies the use of salt.

The Guayal, Bos frontalis, is found amongst the hills, particularly to the south of Sitacra: there are two species, differing in size and little in color; the large one is of dark brown, and the male is nearly as high as a female elephant; the small one is of a reddish brown, it is the Tenasserim Bison, and the Arracanese call them by the same name as the Burmese do. Those Guayals are perfectly distinct from the Shio of the Kookies, which are smaller, have a projecting skin to their neck, and



differ also by the form and direction of the horns. Three species of wild dogs are found on those hills: the first species is known by the Burmese by the name Oobe-looe, and by the Bunzoos Izenia; this dog has pendant ears, from five or six inches long, muzzle from eight to ten inches, straight bushy tail fifteen inches long, length of the body three feet six inches, height from the ground two feet six inches; they are seen going alone or in pairs, and they never feed on animals killed the day before. The second species is called Mungui; they have the ears semi-pendant, going in packs from four to five; their color is white bay or spotted. The third species is Tokooi, they are small with straight ears, and go in packs from fifteen to twenty. The description of these dogs was given to me by my guide, and it was confirmed by the Bunzoos; I have no doubt of its being correct.

Returning from the Bunzoo villages, instead of following the same road by which I went there, I followed the course of a small stream protected from the rays of the sun by bamboos and other trees; another reason which made me choose this way was, that I had been informed that limestone was found in that creek; till now rocks of that nature are unknown at Chittagong, lime used in the district is carried from Sylhet, and purchased at the rate of thirty-five to forty rupees the hundred maunds.

It took me about three hours to get to Chittagong river; both banks of the creek were bordered either by rocks or by hills of various heights, presenting steep sides covered in some places with shrubs, the spring was not considerable, the water was fresh and clear as crystal; in some places the stream rolled gently down, and in others the water descended with impetuosity, forming basins of different dimensions according to the size of the defile: the place where the rock was mentioned is about a mile from the large river, it is from thirty to twenty-five feet high, and in a large cavity is deposited stalagmite, so I have very little doubt that the rock is a limestone; but as I expect a specimen of it, all doubts will be removed on the subject. At some distance from that rock was a bank of black clay, which the Burmese doctor recommends as a medicine to women who are in the family-way to strengthen them. I took some with me, the clay was then very soft, but the next day it was as hard as a brick.



This is, my dear Sir, all the information I could get about the Bunzoo tribe; had I remained longer amongst them, as I intended to do, this people would have given me other details which are desideratum in this imperfect sketch of their manners and customs, but my guide having taken ill with fever, I thought it was useless to prolong my stay amongst them, being imperfectly acquainted with the corrupted Burmese language spoken in the district.

V. BARBE.

Calcutta, 15th July, 1845.

English.	Bunzoo.	Kookies.
God,	Lookar,	Ngion mse.
Devil,	Krec,	Khasin.
Worship,	Mai-moo-roon,	Maimeck.
Person,	Mreiur,	Meiaur.
Man,	Мера,	Mepa.
Woman,	Loo-now,	Noonoo.
Children,	· Now-pow,	
Son,	Mepanow,	at a management
Daughter,	Kemenow,	
Maiden,	Loogua,	Ar.
Husband,	Noo-pa,	
Wife,	Kamadoon,	
Head,	Loo,	Loo.
Forehead,	Mare,	
Hair,	Ssom,	Ssam. Ssam.
Eyes,	Mhe,	Mut,
Nose,	Nhar,	Naar.
Ear,	Na, andui	Na.
Lips,	Mekka,	Noor.
Teeth,	Ah,	
Beard,	Mekkamoor,	
Neck,	Rhin,	King.

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Bunzoo.

Kookies.

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Breast, Atak, Fsan.

Arm, Keeb-an, Coot.

English.

Finger, Cootmatsar,

Nail, Cootmetee, Coot.
Belly, Madeer, Madil.
Thigh, Racoot, Ell.

Leg, Pai-ma-rai.

Foot, Pai, Phai.

European, Lhen, Mengeaco.

Bunzoo, Bom.

Khookies, Panguai, Langet.

Shiamdu, Koosak,
Burman, Ouksah,
Arracanese, Mareim.

House, Cur, Teug.

Roof, Curchun,

Thatch with grass, Phar,

Bamboo, Rhooar, Kooe.

Ratan, Kotoi,
Posts, Jurtoom,
Door, Ma kott,

Window, Wham kott,

Dog, Woee, Hooee.

Cow, Fswepai, Buffalo, Fseloi,

Guyal, Tsar,

Ditto Kooku, Huesha, Shio.
Pig, Wai, Wet.

Bird, Wha,

Peacock, Oohdong, Snake, Marooi,

Hill, Kamoor, Toung.
Tree. Teiu. Thinn.

Tree, Teiu,
Ditto leaves, Teiuna,

Flower, Par, Paar.



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[No. 161.

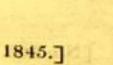
Talaitse.

English. Bunzoo. Kookies. Grass. Bair, Good. Hatsar. Bad. Hats-aloo, Heaven, Van, Hell, Hatsoopatee, Black, Neekna, White, Pooahklan, Red, Pooahtsin, Green, Pooahrin, Yellow, Pooahapaal, Water, Tooe. Tooe, Paddy, Tsan. Ts-am, Thathin. Tsaksai, Rice. Boo. Ditto boiled, Boo, Oil, Kersee. Arahoni, Brandy, Hatchong, Sick, Damloo. Fever. Mailoo, Vomit. Sun-yute, Evacuate, Maremkloh, Fool, Atakdye, Cool. Tsenzoon, Tsur. Knife (table,) Men, Fire, Tongkha, Silver. Gnoon. Guoon, Gold, Dhar. Copper, Shal. Maisee, Necklace, Arkhoil. Bracelet, Beaar. Handkerchief, Kophoo, Governor, Lowoon. Koar, Bengalee, Meetec, Death. Boo. Whaa, River. Thali. Tselei. Tirelock.

Tseleitsec,

Powder.

BOOK!



# Hill Tribes in the Chittagong District.

English.	Bunzoo.	Kookies.
Shot,	Tseleimoo,	
Bottle,	Pelan,	
Year,	Koomnee,	
Month,	Tsakkar,	
Day,	Neekar,	
Night,	Zytye,	
One,	Kakar,	Keaka.
Two,	Penakar,	Panika.
Three,	Toomkar,	Toomka.
Four,	Leckar,	Ta.
Five,	Raignakar,	Nga.
Six,	Rhookar,	Koo.
Seven,	Sreckar,	Sree.
Eight,	Raikar,	Rae.
Nine,	Khooakar,	Ko.
Ten,	Tswurkar,	Sunka.
Eleven, .	Tswinlakakar,	
Twelve,	Tswinlanekar,	-
Twenty,	Roobookar,	
One hundred,	Raizaaker,	Rasa.
One thousand,	Tsankar,	Sunka.
Man's dress,	Ram,	
Woman's dress,	Kyer,	



## Proceedings of the Asiatic Society of Bengal, MAY, 1845.

The monthly meeting of the Society was held on Tuesday evening, the 13th May.

Charles Huffnagle, Esq. senior member of the Committee of Papers, in the chair.

At the commencement of the meeting Mr. Houston, C. S. begged to bring to notice what appeared to him to be an error in the proceedings for October, in relation to the picture voted to Mr. Bird. A conversation of some length arose out of this without the result of a vote. It was proposed by Captain Shortrede, and seconded by Captain Marshall,

"That no report of the Proceedings of the Society at its meetings be published till it has been verified by the next subsequent meeting," —which was carried unanimously.

## New Members Proposed.

Lieutenant Sherwill, 66th N. I., Behar Revenue Survey, -proposed by E. C. Ravenshaw, Esq. C. S. seconded by W. H. Quinton, Esq.

Dr. Henry,—proposed by E. Blyth, Esq. seconded by S. G. F. Heatly, Esq.

The following list of books presented, exchanged and purchased was read:—

Books received for the Meeting of the Asiatic Society, Tuesday, 13th March, 1845.

#### BOOKS PRESENTED.

- 1. Meteorological Register for February and March, 1845.—From the Surveyor General's Office.
- 2. The Oriental Christian Spectator, Nos. 3 and 4, of March and April of 1845.—By the Editor.
  - 3. The Calcutta Christian Observer, of May, 1845.—By the Editors.
  - 4. The Journal of the Royal Asiatic Society, No. XV. Part 2, 1844.
  - 5. Notes on Indian Agriculture.—By A. Gibson, Esq.
- 6. On the Geographical Limits, History, and Chronology of the Chera Kingdom of Ancient India.—By J. Dowson, pamphlet, 2 copies.
- 7. Proceedings of the Zoological Society for 1843, Part II, two copies, and Proceedings from January to March, 1844, one copy.—By the Society.

- 8. Reports of the Council and Auditors of the Zoological Society of London, 1844, two copies.—By the Society.
- 9. Transactions of the Zoological Society of London, Vol. 3, Parts 2 and 3, London, 1843.
- 10. Magnetic Reports of the Observatory at Bombay, May to December, 1843.—By Government.
  - 11. Magnetic Observations for 1842 and 1843, by G. Buist.-Presented by ditto.
- Report on the Meteorological Observations made at Colaba, Bombay, from the 1st September to 31st December, 1842, by G. Buist.—Presented by ditto.
  - 13. Meteorological Observations for 1843, by G. Buist.-Presented by ditto.
  - 14. Tracings of the Wind-Guage for 1842, 1843, by G. Buist.-Presented by ditto.
  - 15. Barometrical Observations, by G. Buist.-Presented by ditto.
- Verhandelingen van het Bataviaasch genootschap van Kunsten en Wetenschap pen. Vols. 18, 19, 1842, 1843.—By the Society.
- 17. Natur en Geneeskundig archief voor Neerland's indie-Eerste Jaargang Batavia. 1844.-By ditto.
- 18. Catalogus Plantarum in Horto Botanico Bogoriensi cultarum alter auctore, J. C. Hasskarl, Bataviae, 1844.

#### Books Exchanged.

- 19. The Annals and Magazine of Natural History, Nos. 96 and 97, Vol. 15, February and March, 1845.
- The Edinburgh New Philosophical Journal by Jameson, No. 74, July to October,
   1844.
- The London, Edinburgh, and Dublin Philosophical Magazine, third series, Vol. 25, Nos. 166, 167, 168, 169, of October, November and December, 1844.
  - 22. Journal Asiatique, Quatrième Série, Nos. 16 and 17, Juillet et Août 1844.
  - 23. The Athenaum, Nos. 900 to 907.

#### Books Purchased.

- 24. Introductory Lectures on Modern History, delivered in 1841, by T. Arnold, second edition, London, 1843.
  - 25. Theogony of the Hindoos, by Count M. Bjornstjerna, London, 1844.
  - 26. Political Philosophy, by H. Brougham, London, 1843 and 1844, 3 vols.
  - 27. System of Logic, by J. S. Mill, London, 1843, 2 vols.
  - 28. Journal des Savans, Septembre and Octobre, 1844.

# Read the following letters, from Messrs. Allen and Co. the Society's London Agents, and W. W. Bird, Esq. :-

To HENRY TORRENS, Esq. Secretary to the Asiatic Society, Calcutta.

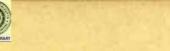
Sin,—We have been requested by W. W. Bird, Esq. to forward you the enclosed letter. We beg to acquaint you that the map referred to by Mr. Bird was forwarded on the 26th February last by the ship Princess Royal from Liverpool, and will be handed over to the Asiatic Society by our agents as soon as it reaches Calcutta.

W. H. ALLEN and Co.

#### London, March 19, 1845.

To HENRY TORRENS Esq. Secretary to the Asiatic Society, Calcutta.

Sin,-With reference to the intimation made by me to the Meeting held on the 5th of July, 1843, I have directed to be transmitted to you the newly constructed Map of



India by Messrs. W. H. Allen and Co. from surveys executed under the orders of the Hon'ble East India Company, which Map is the most complete at present procurable, and to request that you will have the goodness to present it to the Society on my behalf,

I have the honor to be, Sir,

Your obedt. Servant,

W. W. BIRD.

London, February 18, 1845.

## Read the following letter from Mr. H. B. König at Bonn :-

To H. Piddington, Esq. Sub-Secretary of the Asiatic Society, Bengal.
Sin,—I have the honour to inform you that I have duly received, through the agents of the Asiatic Society, Messrs. Allen and Co., the books directed to me, and offer now my best thanks for this valuable communication.

Messrs. Allen and Co. will direct to you the following of my publications:

- 6 Script. Arabum
- 12 Radices Ling. Pracritiana
- 12 Panini, eight books
- 3 Malawica, Agnimitre
- 12 Radices Ling. Sanscrita
- 12 Meghaduta
- 12 Sacuntala
- 3 Lassen's Zeitschrift, part IV. V. VI. 16
- 6 Lassen's Indien I. 1.

I hope the Society may accept these works as a sign of my highest respect. As Sanscrit Literature is much cultivated in Germany, and many works published in India are not to be procured, even in London, I should be particularly obliged, if the Society would have the goodness, to cause about 10 or 15 copies of all works, formerly or lately published in India, to be forwarded to me, for immediate prompt payment, or instruct its agents to let the works be delivered to me at the prices fixed by the Society.

H. B. Konig.

Bonn, 5th December, 1844.

With reference to Mr. König's request to be supplied with a number of copies of all the Sanscrit works published in Calcutta, the Secretary stated that Dr. Roer had prepared a list of Sanscrit works published in Calcutta, which he now presented, from which it appeared that 10 or 15 copies of each would amount to a very considerable sum. He further suggested that as a part of these works had been published by the School Book Society it was possible that body might be willing to send Mr. König their publications through the Society. He was hereupon authorized to refer to the School Book Society in the first instance, and for the details of this application to the Committee of Papers, when a scheme of returns could be finally made up and determined upon by the Society.

The Secretary in laying on the table the papers relative to Mr. Heatly's proposal for the reformation of the Statistical Committee, which had been circulated to the Committee of Papers, stated that the opinion expressed by that body was strongly in favour of the proposition, whereupon the following resolution was moved by Mr. Huffnagle, and seconded by Mr. Torrens.

"Resolved,—that the re-institution of Statistical Researches on a systematic plan by this Society appears a desirable object, and that a Committee be appointed for the purpose of considering and reporting on the specific measures through which this object may be obtained. The Committee to consist of Mr. Heatly and Mr. Alexander,"—which was carried unanimously.

Read a letter transmitted to the Secretary by order of Government from Capt. Nevile H. M. S. Serpent forwarding copies of the Logs of H. M. S. Magicienne in the hurricane of 1818 and 1819 at Port Louis, Mauritius.

The Sub-Secretary pointed out that these logs were printed both in the first and second edition of Col. Reid's work, 1838 and 1841.

Read the following letter from Government :-

No. 1289 of 1845.

FROM F. CURRIE, Esq. Secretary to the Government of India,

To the Secretary to the Asiatic Society of Fort William, the 2nd May, 1845. Foreign Department.

SIR,—I am directed by the Governor General in Council, to transmit to you, for such notice as the Society may deem it to merit, the enclosed copy of a Report by Lieutenant Dalton of his visit to the hills on the banks of the Soobanshiri River.

F. CURRIE,

Fort William, the 2nd May, 1845.

Secretary to the Government of India.

Referred to the Editors of the Journal for publication.

The Secretary presented on the part of W. Seton Ker, Esq. C. S. a Note of the course of study of students in the Sanscrit language.

This interesting note was handed to the Editors of the Journals for early publication.

The Secretary reported that during his absence Dr. Sprenger, now Principal of the Delhi College, had addressed the Sub-Secretary as follows:—

"I have to ask you half a dozen other favors: I send this note to you through Messrs. Ostell and Co. who will pay you for the "Geographie d' Abulfeda en Arabe, 2 vols." which is on sale at the Society for 5 rupees. You have once expressed that you would



sell duplicates of your library if so pray let me have "Asiri Bibliotheca, Arabo-Hispanica, in two volumes," of which you have two copies, you must not charge it too high.

I have written to Messrs. Ostell for De Sacy's Grammaire Arabe, and Hammer's Geschichte der schonen Redekunste, in Persian. If they should not be available at Calcutta, you would oblige me by lending me for a short time the copy of the Asiatic Society; I intend to have the History of Persian Poetry lithographed, and to compile an Arabic Grammar in Urdoo, and want for a few days De Sacy's book.

and that officer having requested Dr. Roer to report on the application, received from him the following:—

To H. PIDDINGTON, Esq. Sub-Secretary Asiatic Society.

Sin,-With regard to Dr. Sprenger's application I have the honor to report, as follows:-

As Dr. Sprenger wants Hammer's "Geschichte der schonen Redekunste in Persian," and de Sacy's Arabic Grammar, for the purpose of publishing an Arabic Grammar for the use of the native students in this country, I would recommend to the Committee of Papers to assist him in his useful undertaking, and to allow him the use of those works for a limited period of two or three months. It would, however, not be advisable to accede to Dr. Sprenger's second request of selling him the duplicate copy of Asiri's "Bibliotheca Hispano-Arabico," a work very rare and valuable, and I take this opportunity of proposing to the Committee to establish it as a rule not to sell duplicates of valuable works, as it is of importance to keep always one copy in the library, while the other may be circulated among the members of the Society.

29th April, 1845.

E. ROER,

Librarian.

I quite agree in, and indeed suggested this arrangement.

H. PIDDINGTON,

Sub-Secretary.

which being circulated to the Committee of Papers for their sanction, Dr. Roer's recommendation was adopted, and the books have been forwarded to him by the steamer viâ Allahabad.

Read the following letter from the Royal Bavarian Academy of Munich:-

Henry Torrens, Esq., Vice-President and Secretary of the Asiatic Society of Bengal. Sir,—Having been favoured, by the intervention of Dr. William Griffith, with your kind declaration dated 23rd May 1844, that you would willingly order an exchange of publications between the Asiatic Society of Bengal and the Royal Academy of Sciences at Munich, I am directed to explain to you how much the Royal Bavarian Academy is gratified by such a literary intercourse. Supposing that the Asiatic Society of Bengal does not possess the series of Memoirs published in earlier times by the Bavarian Academy, a complete set of them shall be sent over to the care of Messrs. W. H. Allen and Company, Leadenhall Street, London. In return we take the liberty of announcing to you, what we are wanting in our library from your most precious publications.

- 1. Index to the 4th vol. of the Mahabharut complete.
- 2. Ináya, 2nd vol. 690 p. 3rd vol. 682 p. 4th vol. 937 p. in 4to.
- 3. Jawame-ool-Ilm-ul-Riazi, 168 p.; with 17 plates 4to.



- 4. Anis-ul-Musharrahin, 541 p. 4to.
- 5. Sharaya-ool-Islam, 631 p. 4to.
- 6. Tibetan Dictionary, 373 p. 4to.
- 7. Vocabulary of Scinde language, by Capt. Eastwick.
- 8. Grammar and Vocabulary of the Baloochi and Punjabee languages. Leach.
- 9. Harriwansa, 563 p., royal 4to.

The other books are in our possession, and also partly the most interesting Journal of the Asiatic Society of Bengal, the completion of which by your kindness, I take the liberty to ask for. There is wanting of this most precious Journal, vols. I. II. III.; From the year 1839, are wanting the months of August, September, October and November; from 1841 is wanting No. CXIII., and from No. CXVIII. all is wanting published till to the present day. We should consider as a particular favour your friendly intervention for the completion of this work.

In the box containing the newer publications of our Academy, you will also find the Almanacks of the last years, which give a general catalogue of all our publications, and of which I beg you to select any more you may believe interesting for the purpose of the Asiatic Society. Also you will find there two little books of my own: Systema Mat. Med. Veget. Brasiliensis, and on the Constitution, Sicknesses and Physics of the American tribes, which I beseech you to present in my name to the Asiatic Society.

Regarding the Society's wish of possessing specimens of German geology, we have treated on this matter in the physical class of our Academy, and the members concerned in similar studies have been directed to get together a convenient collection for the Technic Geological Institute of your Society. But it is understood that such a collection cannot be ready immediately. After its completion it shall be committed into the hands of your agent at London. Every communication in any branch of natural history the Asiatic Society may think convenient for us, shall be highly acceptable. I beg you to send the Society's communications either by London, where your agent may take care of them, or to Hamburgh directly, where Mr. G. T. E. Roeding is the Academy's agent.

Allow me, Sir, to present you the assurance of the high consideration with which I have the honour to be,

DR. MARTIUS,

Secretary of the Math. and Phys. Class of the Roy. Academy of Sciences.

Munich, 6th of January, 1845.

The Secretary was authorized to dispatch to the Royal Bavarian Academy the books required, and to express the gratification of the Society at the opening of an intercourse with this learned body.

Read the following note from Major Wroughton pointing out a misconception as to Colonel Stacy's Hebrew MSS. (Proceedings of January).

My DEAR SIR,—I have just received a letter from my friend Colonel Staey, in which he mentions that the Hebrew MS, sent by me, in his name, to the Asiatic Society's Museum, has by some misapprehension been considered as a donation. I have no recollection of the exact purport of my note, which accompanied the MS, but feel confident, if you



will kindly refer to it, that "I merely sent the MS. at Colonel Stacy's desire, to be lodged in the museum of the Asiatic Society."

Ballygunge, April 16th, 1845.

ROBERT WROUGHTON.

The Secretary stated that a note had been duly appended to the MSS. for which a tin case had been made, so as to preserve it as much as possible from all chance of injury.

Read a letter with Prospectus of his work forwarded by Dr. Falconer:\*-

Prospectus preparing for publication, under the auspices of Her Majesty's Government, and of the Honourable the Court of Directors of the East India Company:

#### A work to be entitled,

#### FAUNA ANTIQUA SIVALENSIS,

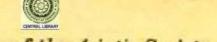
Being the Fossil Zoology of the Sewalik Hills, in the north of India, by Hugh Falconer, M.D., F.R.S., F.L.S., F.G.S., Member of the Asiatic Society of Bengal, and of the Royal Asiatic Society; of the Bengal Medical Service, and late superintendent of the H.E. I. C. Botanic Garden at Saharunpoor, and Proby T. Cautley, F.G.S., Captain in the Bengal Artillery, Member of the Asiatic Society of Bengal, &c.

The object of this publication is to make known, in a connected and complete series, the numerous fossil animals which have been discovered in the North of India, by the Authors and other inquirers, during the last twelve years; and to develope the bearings of these discoveries on the physical and geological history of India during a great part of the tertiary period.

The fossil Fauna of the Sewalik range of hills, skirting the southern base of the Himalayahs, has proved more abundant in genera and species than that of any other region yet explored. As a general expression of the leading features, it may be stated, that it appears to have been composed of representative forms of all ages, from the oldest of the tertiary period down to the modern, and of all the geographical divisions of the Old Continent, grouped together into one comprehensive Fauna in India. Of the forms contained in it may be enumerated, in the Pachydermata, several species of Mastodon and Elephant, the Hexaprotodon Hippopotami, Merycopotamus, Rhinoceros, Anoplotherium, Sus, and three species of Equus; in the Ruminantia, the colossal genus Sivatherium, peculiar to India, with species of Camelus, Camelopardalis, Bos, Cervus, and Antilope; in the Carnivora, species of most of the great types, together with several remarkable undescribed genera; in the Rodentia, several species; in the Quadrumana, several species; in the Reptilia, the Gigantic Tortoise (Colossochelys) with species of Emys and Trionyx, and several forms of Crocodile. To these may be added the fossil remains of Birds, Fishes, Crüstacea, and Mollusca.

The materials in the possession of, or accessible to, the Authors, are singularly rich and abundant. They consist of vast collections made by themselves during the last twelve

<sup>\*</sup> We re-print here the prospectus which will also re-appear for some time in an abridged form on the cover of the Journal as an advertisement, and we trust that the work will find in India the support it so richly merits.—Ens.



years along several hundred miles of the Sewalik range. Of these, one portion, which comprises the contents of upwards of two hundred chests, is now deposited in the British Museum, having been presented to the national collection by Captain Cautley, and will with the consent of the Trustees, supply the chief part of the descriptive details and illustrations of the Work. Other large collections in the India House will be resorted to when requisite; and in cases where their own materials may be less complete, and they will have access to specimens from the very extensive collections made by their friends and fellow-labourers, Colonel Colvin and Captains Baker and Durand, of the Bengal Engineers, whose published researches will be incorporated in the projected publication.

In order to embrace in it as far as may be possible a general Fossil Fauna of the Continent of India during the tertiary period, illustrations will be drawn from the Irawaddi fossil discoveries of Messrs. Clift and Crawford; from the researches of Dr. Spilsbury in the valley of the Nerbudda; and from those of Dr. Lush and Lieutenant Fuljames in the Gulf of Cambay, all of which localities have yielded fossil remains like those found in the Sewalik Hills. With the same object, all the available materials relating to the osseous remains of the elevated plains of Thibet, which are so importantly connected with the geological history of the Himalayahs, will be examined by the Authors, and described or figured when necessary.

On the completion of the palæontological details, a comprehensive account will follow, embracing the general results of the fossil inquiries, together with a geological description of the Sewalik Hills, to serve as an Introductory Chapter to the work. The Authors will have the aid of some of the most eminent living Naturalists in describing such departments as they may feel themselves but imperfectly qualified to deal with, such as the Fossil Fishes, Crustacea, and Mollusca.

The Authors have been induced to undertake the work by the belief, that the scientific reputation of this country and the credit of the Indian services are concerned in bringing to light researches embracing so many new facts, and bearing so importantly on the past physical history of the vast possessions of the British Empire in India. They are not insensible to the difficulty and extent of the subject, but they hope that they are in some measure prepared for it, by previous investigations, extending through several years.

In order to secure to science the full advantage of the Sewalik fossil researches, in a suitable form of publication, Her Majesty's Government and the Honourable Court of Directors of the East India Company have been pleased to accord such an amount of aid in limine as will ensure the successful progress of the work. The Publishers anticipate that a corresponding measure of support will be afforded by the scientific classes in England, by the British community in the three Presidencies of India, and by scientific men abroad.

Plan of Publication.—The Work will appear in about Twelve Parts, to be published at intervals of about four months, each containing from twelve to fifteen folio Plates, or an equivalent number of a larger size, where the nature of the subject may require it. The Plates to be accompanied by royal octavo letter-press. The price of each Part will be One Guinea in Europe, and Sixteen Rupees in India.

PART I.—Containing the Mastodons and Elephants will be published on the 1st of July, 1845.

Subscribers' Names will be received by the Publishers, Messrs. Smith, Elder and Co., 65, Cornhill, London; and by Messrs. Thacker and Co., Calcutta; Forbes and Co. Bombay; and Messrs. Frank and Co., Madras.



# Read the following memorandum and letters :-

Memorandum.

The Secretary has to transmit two letters from the Baron Van Hoevell, and Baron de Carnbee (the latter gentleman being now in Calcutta) touching the establishment of a correspondence between our Society and that of Batavia.

I propose being authorised to send an acknowledgment of the books received, a series, as far as available, of the Journal, and the vols. of the Researches available for distribution, with a letter of thanks, and reciprocrating wish to correspond.

If Messrs. Piddington and Blyth would draw each of them a note of objects in natural science desirable for our Museum from Java, with a request that we in our turn may be instructed from Batavia in like manner, these would materially add to the value of my letter.

I have seen the Baron de Carnbee, and have come to a most satisfactory understanding as to the footing on which the Societies would correspond.

H. Torners,

Vice-President and Secretary, Asiatic Society.

The Curators are requested to peruse the accompanying note and letters, and to put in a brief statement of the desiderata from Batavia in their several departments, which I can send down with my letter to the Society there. I have ascertained from Baron de Carnbee that English will be a convenient language of correspondence.

The Curators may state generally what duplicates or sets of duplicates they hold ready to transmit.

The Batavian Society are rich in Volcanic specimens.

H. TORRENS.

Vice-President and Secretary, Asiatic Society.

A Monsieur H. Tonnens, Secrétaire de la Société Asiatique à Calcutta, etc.

Mos cher Mossieur,—Je me rappelle avec plaisir notre entrevue d'hier. L'intérêt que vous manifestiez au développement et progres dela Société Scientifique à Batavia, causera je vous en donne l'assurance, la plus grande satisfaction a tous les membres, et moi je me félicite de pouvoir leur communiquer l'heureux résultat de mes démarches. Sir Stamford Raffles, pendant plusieurs années président de notre Société, disait dans un de ses discours: "The objects of the Asiatic Societŷ in Calcutta are so fully explained in the discourse of Sir William Jones, that it is unnecessary to enter into any explanation of them here. The researches of that Society are not confined immediately to Western India; they extend throughout the whole regions of Asia. The whole circle and the wide field of Asia are alike open to your observations, but it occurs to me, that the interests and objects of the Institution will be more advantageously promoted by its exertions being directed to what falls more immediately within your reach, &c."

J'espère que vous partagerez mon intime conviction qu'une correspondance régulière et continue, contribuera a servir efficacement le but de nos Sociétés reciproques.

J'ai eu l'honneur de vous faire voir quelques ouvrages récemment publiés à Batavia. Vous m'obligeriz d'accepter de ma part pour votre Société un exemplaire du : "Cutalogus Plantarum in Horto Botanico Bogoejensi; auctore J. C. Haskarl, 1844," et un exemplaire du :"—" Natuur und Geneeskundig Archief voor Neerlands Indie" (Archive pour les Sciences naturelles et medicales des Indes Neerlandaises 1st Année 1844.)

Avant mon départ de Calcutta j'écrirai à Monsieur le Baron van Ijboevell (Président de notre Société) qui vous offrira d'autres publications entre autres le "Tydschrift voor

Proceedings of the Asiatic Society.

Neerlands Indie," qui existe deja sept années, et contient plusieurs articles intéressants par rapport a la littérature Javanaise et autres branches scientifiques. A mon retour en Europe je pourrai traduire et arranger en Anglais quelques articles de ma composition traitant des Isles our de l'Archipel de la Sonde, etc. et je me trouverai heureux si après avoir été examinés, ils pourraient être placés dans le Journal de la Société Asiatique à Calcutta, Enfin, Monsieur, je vous prie d'accepter l'assurance de mon respect et considération et me signe

Votre tres humble Serviteur,

BE. G. MELVILL DE CARNBEE.

Calcutta, de 27 Mars, 1845.

A Monsieur le Secretaire de la Société Asiatique à Calcutta.

Monsieur,-Monsieur la Baron Melvill de Carnbee, officier distingué de la Marine Hollandaise, chevalier de l'ordre Royal du lion Belgique et membre correspondant de la Société des arts et sciences de Batavia, se proposant de partir en peu de jours pour Calcutta, nous profitons avec empressement de cette occasion favorable pour adresser a votre honorable Société les deux exemplaires ci-joint des 18 et 19 volumes des Transactions de notre Société, qui renferment des documens precieux pour la litterature orientale

Nous vous prions Monsieur, de vouloir honorer Monsieur le Baron Melvill de votre bonté, et bienveillance et de faciliter, tant que possible, les recherches scientifiques qu' il se propose de faire dans l'Inde Brittanique.

Recevez Monsieur, l'assurance de notre consideration distinguie.

La Direction de la Société des Arts et Sciences de Batavia,

VAN HOEVELL. LEFECREHAVIE. N. MYER.

Batavia, le 2 Janvier, 1845.

The Secretary stated that he had received from the curator of the Geological and Mineralogical Departments, his note of desiderata, and forthwith handed it to M. de Carnbee, and that he held now in his hand that of the Zoological curator which would be forwarded with his reply to the Society of Batavia.

Read the following letter from the Rev. Mr. Long :-

To H. Torres, Esq. Secretary, Asiatic Society.

DEAR SIR,—When on a visit to Kishnagar last January, I was favoured with a view of several pictures belonging to the Rajah of Kishnagar, three new portraits of various members of his family, and among the rest of Rajah Krishna Chandra Roy, of whom a most interesting memoir has been published in Bengali.

The drawings are kept in a damp place and are rapidly going to decay.

As one object of the Asiatic Society is to obtain rare drawings or portraits illustrative of the history of the country, it would be a desirable object to obtain the loan of those portraits in order to have copies taken.

The East India Company lie under deep obligations to Rajah Krishna Chandra Roy, as through his friendly disposition towards the English, and his influence over various Hindu rajas; the overthrow of the tyrant Suraj ad Doulah was facilitated.

Calcutta, April 17th, 1845.

JAMES LONG.



Mr. Long not being present the Secretary was desired to make some further inquiries.

Read the following letter from W. H. Hoff, Esq., the coins and human hand being on the table.

To H. Torrens, Esq., Secretary, Asiatic Society.

SIR,—I have in my possession a few articles which I will send over if you think that they will be acceptable to the Asiatic Society.

The first is one of fifteen coins found in the interior and uncultivated parts of Singapore. On having a patch of land dug up, a gentleman discovered an earthen pot containing them. I have been unable to ascertain of what metal or mixture of metals the coin is composed; but I am inclined to think that zinc and silver have been employed in its manufacture. The obverse side bears the faint traces of some unknown characters, and on the reverse side there is a rude device of a lion or some other beast.

The next is a glass vessel containing a human hand kept in pepper. It belonged to a notorious footpad or robber who was long a terror to the inhabitants of the Nicobars, and had for a considerable time escaped punishment. He used to propel poisoned arrows through a null or tube about a yard in length merely with his breath! He was at last shot; but it was found impracticable to extricate the null from his death-grasp: it was consequently sawed off on both sides. The remaining portion is still in the clutch of the large and hairy hand.

24 March, 1845.

WM. H. HOFF.

The Secretary submitted, from the Sub-Secretary, a prospectus of a New Zodaical Map, to be edited by J. W. Woollgar, F. R. A. S., upon a new projection, and to a convenient scale; corresponding with the Maps of Schwink, and a little larger than those of Professor Argelander, containing about 1000 stars visible to the naked eye. The Sub-Secretary suggested that such a map (the price being also only 7s. 6d.) would be a useful addition to the Society's port-folios, and moreover that the Society might appropriately present one to the Prince of Mekhara. (See Proceedings October, 1844.) Two copies were ordered to be subscribed for.

The Sub-Secretary presented on the part of Captain F. M. Crisp of Moulmein, a grass petticoat and scarf worn by the women of the better classes at Teresa, one of the Car Nicobar Islands.

Read a letter from the Count Ange de St. Prieux, proposing that the Society should contribute either by funds or by the purchase of copies of a work entitled, "Antiquités Mexicaines" to the expenses of a joint "Commission Scientifique Americaine" formed at Paris for the further exploration of American Antiquities.



It was resolved; that the Society regret its inability to co-operate, but that it feels it to be its duty in the first place to lend all its assistance to the efforts which may be made to investigate the yet unexplored fields of purely Indian Antiquities.

The Secretary read extracts from a private letter to his address from Lieutenant Fletcher Hayes, 62nd N. I., dated from Kya Ghurra, N. W. of Shikarpore, in which that officer who had just returned with the troops from the campaign in the Murree and Bhoogtee hills, mentions his having found the great utility of the "admirable vocabulary" of the Beloochee languages (by Major Leech), published in the Society's Journal, (Vol. VII. p. 538) and offers additions to it both in words and in phrases: this the Society would most thankfully accept and give early publication to.

Read the following memorandum, accompanying one of the New Zealand Jade-stone idols presented to the Society by Captain Fox.

#### Memorandum.

This stone was sent from New Zealand by a Mr. Lucette to me,—The stone is of value,—and particularly so in China. The Idol is often passed as a heirloom from generation to generation, as the supposed certain means of preventing any casualty in a family when contagious diseases predominate.

W. Fox-

31st March, 1845.

# Read the following letter from Colonel Ouseley :-

My DEAR SIR,—I promised to send you a copy of the original Sketch I did, and forwarded June 13, 1834, to Lord William Bentinck, of the Nerbudda. I have added to this now sent the great coal field of Benar (and other coal) I discovered; and hope you will complete the sketch you gave in No. 151. (No. 67, 2nd Series).

From the nature of the coal procured at Benar I am quite sure, that the Bombay and Calcutta railways should pass there. The best iron and the best coal in India are produced there. The line should run along the foot of the Hills, where the Nulas are small, not near the Nerbudda when the nullas become wide chasms, and ravines of such width and depth as would greatly add to the expense of the road.

J. H. Ouseley.

Chota Nagpur, 29th April, 1845.

P. S. The whole of the remarks on the left and right banks of the Nerbudda noticed in the printed sketch are verbatim from my own map, and the divisions on both sides of Estates, &c. as you could see if you ask Major Wroughton, Deputy Surveyor General, to allow you to look at the original.

J. H. O.

The map sent by Colonel Ouseley extending from Jubbulpore to Hoshungabad, and that compiled by the order of the Government N. W. P. and reduced for the Journal, Vol. XIII., from Hoshungabad



to the sea, were both on the table. The Editors of the Journal were directed to give all due publicity to Colonel Ouseley's labours by an additional lithograph in the journal, including the coal site of Benar and railroad sketch as added by him.

Read the following letter from Captain Fox, giving an account of the loss of the collection made by him for the Museum :—

H. Torrens, Esq. Secretary, Asiatic Society.

Sir, -In the month of January last year, Mr. Blyth of the Museum, put on board the vessel I commanded a box, together with a quantity of Arsenical Soap, and other articles for the cure of such of the desiderata at New Holland and New Guinea, I might be enabled to procure. The boy and I succeeded in obtaining at New South Wales a tolerably good and large variety of specimens, which were packed up, but getting wet I was compelled to order their being thrown away in consequence of the offensive effluvia they emitted. A Satin and Regent Bird I cured myself, and being badly done, I took less care of them; they were suspended in my cabin, and remained good, and I believe a hawk the boy kept with his clothes. I did not visit Maulmein, having resigned command of the vessel. Among other things I lost a beautiful Eagle-hawk, Black-swan and a Wallahby. I had fondly hoped to have been the first to have brought a large quantity of specimens from New Guinea for our Calcutta Museum; but that gratification I was compelled to forego in consequence of annoyance in Sydney. Subsequently I brought the boy with me in the " Minerva," by which vessel we returned passengers, and owing to the crowded state of so small a vessel, (146 tons with 100 souls on board) the Captain directed the large box to be put under the stern boat, and one Sunday morning we all saw the box for a few seconds astern, it having fallen overboard and sunk. boy behaved very well and is an excellent lad, and no blame whatever can attach itself to him. I am very sorry for so great a loss; but I trust the explanation will meet your approbation-

Your most obedient Servant,

W. Fox.

Calcutta, 16th April, 1845.

The Secretary stated that he held in his hand two MSS. books, containing notes and sketches made in the Hills, which had been kindly forwarded for publication in the Journal by Captain Marshall, but that the Editors had thought with reference to the time elapsed since the notes were made, and their somewhat private and domestic character, that they were not exactly suitable for the pages of the Journal.

Memorandum.—These note books were subsequently withdrawn by Captain Marshall.

Read the following letter from the Local Committee of Education at

To H. Torrens, Esq. Secretary, Asiatic Society, Calcutta.

Sir,—The Local Committee of Education at Agra being engaged in the formation



of a Museum of Economic Geology, in connexion with the Agra College, direct me to address you on the subject, and to state that—

- 2. They doubt not but that they may rely on the sympathy of the Asiatic Society in favor of an undertaking which has for its ultimate aim the ascertainment and development of the mineral resources of this country, and primarily, of the North Western Provinces, as yet so imperfectly determined.
- That should your Society be possessed of any disposable Geological Specimens of the economic kind, the Committee would feel greatly obliged by being favored with them.
- 4. As this work has been but just commenced, the Committee are at present unable to offer to your Society any thing in return; but they trust they may by and by be in a position to reciprocate the favor for which they now ask.

I have the honor to be, Sir, Your most obdt. Servant,

J. MIDDLETON.

Secretary.

Agra College, 1st May, 1845.

The Curator Museum Economic Geology stated that a few specimens would be available from that Department, and is preparing them for forwarding was accordingly sanctioned.

REPORT OF THE CURATOR GEOLOGICAL AND MINERALOGICAL DEPARTMENT AND MUSEUM OF ECONOMIC GEOLOGY FOR THE MONTHS OF MARCH AND APRIL.

Geological and Mineralogical.

We have received from Government a report addressed by Captain Tremenheere B. E. of Maulmein to the Military Board, on the prices of tin ore, with specimens of tin ore from a new locality called Henzai to the north of Maulmein, and also of some supposed copper ores, or indications of copper, from the Maulmein hills in that vicinity, but on examination they prove to be only the well-known pavonine Antimonial coatings, as nothing but Antimony and Iron can be traced in them; though so much resembling copper as to be taken for it even by experienced persons.

This has been duly reported upon to Government, and Captain Tremenheere's attention directed to the scite of Batto Kayen Karian near Maulmein, from whence we have a true copper ore in the Museum; supposed to have been sent by Lieutenant Foley to Mr. James Prinsep.

Captain Phayre, Assistant Commissioner, Arracan has sent us from Sandoway a series of specimens carefully numbered and catalogued, with the following letter:—

"My DEAR MR. PIDDINGTON,—You may remember you asked me to procure a series of the rocks occurring from the foot to the top of the Aeng pass. I have not been able to do this, but having gone in December to the top of the Yoma range of mountains, direct east of this town, I collected a complete series of the rocks and have now the pleasure to send them, together with a map, and a note on the route, &c.

I hope my remarks may be intelligible, though I have great doubts thereon, however, I have done my best to meet your wishes. I looked out particularly for the minerals you mentioned (and of which you sent a box of specimens, herewith returned with many thanks) but was not fortunate enough to meet with any. I could not delay at the spot, or I should have remained a day or two longer.

Sandoway, Feb. 25th, 1845.

A. P. PHAYRE.

P. S. In your letter dated the 4th August, 1844, you allude to a paper of queries regarding the volcanic islands on the coast; this paper I never received, and I fear I shall scarcely be able to proceed to the islands this season; but if you will kindly transmit the queries, they may induce me to go, and show me also what you require."

Captain J. Abbott, B. A. has obliged us with a paper on Kunkur, with specimens containing his views on its formation, which will doubtless be printed in the Journal, as offering, especially, views formed on the spot and in the alluvial soil : to which I refer more particularly, as Captain Newbold has lately favored us with his views principally from the Kunkur fields in the great trap formation of Central India.

Through Captain Baker, B. E. we have received a letter from Lieutenant Blagrave which should have accompanied his boxes of Scinde fossils and fish. It is as follows :-

#### To the Secretary to the Asiatic Society, Calcutta.

SIR,-I have the pleasure of sending you a few fossil shells and zoophytes found in the neighbourhood of Roree, Tatta, and Kurachee, also a few recent sea shells found in the tops of the sand hills in the vicinity of the Ullah Bund, and some fish from the Sindra lake. As I hear that the Society are publishing Sir A. Burnes' illustrations of the fishes of Scinde, some of these may be new, as I believe he got none of the fishes of the Sindra lake, and thought that none existed in it on account of the extreme saltness of its waters; but when I visited it, in July last, the banks were strewn with fish and water insects evidently thrown upon the shore by some recent storm, along with several small dead birds and thousands of locusts, which had evidently perished in trying to cross the lake. There were several other kinds of fish both large and small, which I had not the means of carrying away with me; many quite new, at least to me; however, if I re-visit that neighbourhood, I will make a collection for the Society's Museum. I had intended sending a collection of recent shells from the beach at Clifton, (Kurachee) along with the fossil ones, for comparison, but I have had no time to make the selections or even to look over the fossils, among which there may be a lot of trash; but should I be here another year, should the Society wish it, I will endeavour to make a good collection of both for them. I shall be employed in surveying the hills on the western boundary during the cold weather, and if I find anything worth sending will do so. Can you give me any hints for analizing soils, as I think it would be to the advantage of Government were the different kinds of soils in Scinde known, and oblige, Yours truly,

1st October, 1844, Camp Kurachee.

T. C. BLAGRAVE.

From Mr. Conductor Dawe we are apprised of the dispatch of five chests of fossils selected by him, under Captain Baker's directions, from the remains of the Dadoopoor Museum, which are on their way down to us.

We have to announce also two more papers of great importance from Capt. Newhold, being "Notes on the Geology of the Southern Mahratta Country," and "Geological Notes across the Peninsula," which will no doubt find an early place in our Journal.

# MUSEUM ECONOMIC GEOLOGY.

We have received from Captain Sherwill a box of stones for trial as lithographic stones from the table-land of Rhotasghur, but I fear most of them will be found too siliceous or too thin. Many indeed are evidently defective, but some promise well, and I shall take steps to have them fairly tried.

Major Williams of Kyook Phyoo, who some time ago sent us a minute specimen of a stone called Samy stone in the West of India, as having been sold to his brother by a

Cavalry soldier, as highly valuable for the purpose of polishing the bits of bridles, (See Proceedings of January, 1845,) has now sent us a larger specimen, which proves it to be the common Agalmatolite only, and not as I had judged by the examination of the previous pepper-corn specimen, the fine variety called Pagodite. Major Williams says:—

My DEAR SIR,—My brother has sent me a larger piece of the "Samy Stone," and requests I would send it to you, and I shall feel extremely obliged if you could inform me where I can obtain a quantity of it. Dr. Rose has kindly consented to convey it to you. My brother mentions also his having sent your former letter to me on this subject to Mr. Murchison, the Geologist; the stone appears to be in request at home, more so perhaps than in India, where its use is not known apparently.

Kedgeree, 25th February, 1845.

D. WILLIAMS.

Whence I presume that it has been found, as I supposed, of use at home, or at least that, as I have remarked, it was thought well-worth attention when a quantity could be procured. I have written to Captain Ouseley requesting him to send us a good cooley load of his Agalmatolite from Chota Nagpore, with which this is identical.

We have received from the Dundee Watt Institution, through Dr. Wise, a box of Mineralogical and Geological specimens, some of which are handsome and of interest, but many, indeed most of them are unfortunately without labels, which, for the Geological specimens particularly, is a very great drawback on their value.

Mr. W. St. Quintin, C. S. has referred to us from Darjeeling specimens of a quartz pebble and of fibrous hornblende rock, supposed to contain Gold, but the appearance is due merely to common pyrites. This might nevertheless be auriferous, but is in too small quantity to be detected in such very minute specimens; the rock might contain but one-tenth part of pyrites and the pyrites but one hundredth part of gold and yet be worth working on the large scale.

For all the above presentations and communications the best thanks of the Society were accorded.



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## JOURNAL

OF THE

# ASIATIC SOCIETY.

Notes on the Religion of the Sikhs, being a Notice of their Prayers, Holidays, and Shrines. By Major R. Leech, C.B., Political Agent, N. W. F. From the Political Secretariat of the Government of India,

The works of "Guroo Sobha" and "Bichitar Natak" have been consulted, and extracts made.

It will appear extraordinary that the Sikhs, who are forbid to worship at a Hindoo Mándar, should frequent Hindoo places of pilgrimage; but such is the case. Sikh pilgrims to the Ganges at Hurdwar have for many years past been increasing, and nothing is more probable than the Sikhs gradually re-adopting many more Hindoo observances.

Govind Singh prophesied that the Sikh's Derahs, or Shrines, would amount to 56,00,00,000.

### Prayers.

The Sikh Japjee, composed by Guroo Nanak, answers to the Hindoo Gaitree repeated in the morning.

The Sikh Japjee, composed by Guroo Govind Singh, answers to the Hindoo Bisan Sahansar, (a morning prayer).

The Sikh Sukhmanee, composed by Guroo Nanak, answers to the Hindoo Geeta, (a morning prayer after ablution).

The Sikh Rouras, composed by Guroos Nanak and Govind, answers to the Hindoo Sandhija Tarpan, (a sunset prayer).

No. 162. No. 78, NEW SERIES.



The sixteen Arthees, composed by Guroo Nanak, are repeated the last thing before going to sleep, and it is the lock on the tongue; the key being next morning's Japjee.

The Sikh women repeat "Asá kee wár," (composed by Guroo Nanak,) by which they are absolved from again being born in the likeness of woman.

### Holidays.

The Daserah, the Suddee, 10th of the month Asoo, the commencement of the Hindoo military year, the opening of the season for the military operations.

Basakee, the spring festival on the 1st of Besak.

The anniversary of Guroo Nanak's death on the Wuddee, 5th of Asoo, (called Gur-parb).

The anniversary of Guroo Govind Singh's departure on the Buddee, 5th of Besak.

The Dewalee; a feast of lamps, the last day of the Buddee, half of the month Katick.

Maghee; the last day of the Buddee, half of the month Magh.

Basant Paunchmee; the Buddee, 5th of the month Magh.

The Hola, (Holee); the last day of Phagan.

### Shrines-Of the 1st Guroo, (Nanak.)

 Nankane-a-Derah, the village of his maternal grandfather, where he played as a child, 30 kos from Lahore.

2. Derah (par excellence,) on the river Ravee, his birth-place. (He is said to have been born ready dressed in green.)

3. Sultanpoor, where he kept a shop for his brother-in-law. The weights used by him are worshipped.

4. Nanak Malak, an impression of his hand on the leaves of a Peepul tree; the leaves are brought away as relics, and the tree is worshipped. There is now a flourishing village.

5. Panjah Sahah; the impression of his hand on a rock that he prevented falling on him at Hasan Abdal.

# Of the 2nd Padshah, (King) Angad.

1. Khadoor Derah; the place of his death, near Taran Taran.



## Of the 3rd Guroo, (Amardas.)

Gondwal Derah; a well of 101 steps to descend, on each of which the Japjee is repeated. He also died at this town. There are two Grunths at the spot whence he departed.

#### Of the 4th Guroo, (Ramdas.)

Sree Amritsar, (the Nectar tank); was brought into notice by him, though the Sikhs deny that it is modern. It was first called by him "Ramdas dee puree." There are five Teeruths.

- 1. Amratsarjee; in the centre of which is the Darbar Sahab's building, containing the Grunth in Guroo Nanak's own hand-writing. It was built by Runjeet Singh, or rather superbly repaired. The steps of this building are looked upon as the Hurdwar ones. The rank Sikhs of the present day therefore do not go to the Ganges Hurdwar, and even speak lightly of that sacred stream as the "bone-devouring."
- 2. Koulsar, (the Lotus tank); people wash their feet here before presuming to bathe in the holy of holies.
- 3. Babegsar; round which the Nahangs reside, and bathe in it before going to the Amratsar.
- 4. Mukatsar; from bathing constantly in faith, in which exemption from further birth in the flesh is obtained.
- 5. Ramsar; the tank in which Hindoos and others, not Sikhs, bathe before going into the water of Amratsar.

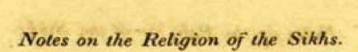
On the brink of the tank opposite Darbar Sahab's Darsance entrance is the Akal Bangah, and two jhandahs or standards, (rather giant spears covered with gold, and having a khinkab cover.)

The golak (collections 1\frac{1}{4} rupee from each convert,) of Guroo Govind Singh, is deposited in the Akal Bangah. Chiefs sometimes pay 1\frac{1}{4} hundred rupees on the Pahul being administered there to a child.

The Deewalee festival is the season for performing pilgrimage to Amratsar. Pilgrims also assemble in Basakee, Dassera, Horee and Niaghee. These five festivals are called the five Dhams or Tihars.

# Of the 5th Guroo, (Arjan.)

- 1. Lahore; his residence for many years.
- 2. Derah-Kartarpoor.
- 3. Taran and Taran; two shrines, five or six kos apart; the latter being the place of his death.



Lepers are cured by bathing in faith in the tank. A great number of lepers reside round the tank, and two or three are cured every year. If any one on going there fears to approach or touch these lepers, he becomes himself a leper. Many of them are rich, and trade; no customs or duties are levied on their goods.

### Of the 6th Guroo, (Har Govind.)

Sree Govindpura; his Derah, the place of his death.

#### Of the 7th Guroo, (Har Rae.)

- 1. Keertpur; his Derah, the place of his death, and also of his Mahal (wife). The tank in which he washed his feet is called, by the Sikhs, Charan Koulsar.
- 2. Bangah, in the Singpooria state; at Keertpur is the Derah of Baba Gurditta.

#### Of the 8th Guroo, (Har Krisen.)

1. Delhi; the place of his death, (by small-pox.)

#### Of the 9th Guroo, (Tegh Bahadur.)

- Dehra, at Anandpoor; where his head was burnt on being brought by his Rangretas from Delhi.
- 2. Saifabad, in the Pateala territory; where the Raja has lately built a fort.
  - 3. At Delhi, called Bangala; where he was killed.
- 4. Ditto; where his body was burnt. There is also at Delhi a shrine of Mata Sundaree, and another called Rakabganj.
  - 5. At Benares.

## Of the 10th Guroo, (Govind.)

- 1. Anandpoor; where there are seven Jhandas and Dehras.
- 1. Guroo Tegh Bahadur.
- 2. Kesgurh; where he converted five Sikhs, or rather initiated them and made them initiate him, and let their hair (kes) grow.
  - 3. Mata Jeeto; the wife (Mahal) of Guroo Govind: she died here.
- 4. Damdama; the breathing-place, where he took breath and turned on his Musalman pursuers.
  - 5. Holgurh; where he played the Holee.



- 6. Agampura; from a vision revelation to Mata Jeeto there.
- 7. Manjee Sahat; the cot on which she sat to receive saluta-

There is a melah or collection of pilgrims in the Holee.

- 2. Dehra of Guroo Govind at Bangah.
- 3. Jandpoor; where he halted in his flight from Anandpoor.
- 4. Macheewara; where his Musalman friends, Nubee and Ghunee Khans, saved his life, by disguising him.
  - 5. Naknour; five kos from Ambalah, where he fled from Macheewara.
- 6. Muktsar, in Malwah; where he bathed and promised exemption from transmigration to all his followers who did the like in faith.
- 7. Damdama; where he again took breath, and blest the place as learning-inspiring, calling it his Benares, where the greatest dunces should become scholars.

At the present day the best writers of the Gurmukhee character are at Damdama, which belongs to the Shaheed family.

- 8. Kapal Mochan, near Belaspoor. This is a great place of Hindoo pilgrimage.
  - 9. Nanheree, near Ambalah.
  - 10. Pa'unte Sahat, across the Ganges.
  - 11. Patna; where he was born.
- 12. Abjal Nagar; where he died, (in the Deccan). There is a melah on the Buddee, 5th of Besak.

There is a Derah of Jeet Sing and Jazar Singh at Chamkour, where these sons of Guroo Govind were killed by the Musalmans.

The Derah of his two other sons, Fatteh Singh and Zorawar, is at Sarhind, where they were built alive into a wall by the Musalmans.

Sarhind is called by the Sikhs, Fattehgurh; from Fatteh Singh being killed there. They also call it Phit moonhe (spit in the face,) and sometimes Ujar shahr, "the desolate city."

The Derah of Mata Guzaree is near that of her Shahzada, grandsons; she fell down dead at the sight of the living wall. There is a melah during the Holee.

There is a shrine or Derah of Baba Sahat Singh, at Ambalah, who was a Bedee Sikh; who is called by some the 11th Guroo, and is said to have caused the elevation of Ranjeet Singh by his blessing, and by giving him his sword: he died eleven or twelve years ago, from grief at



the death of his son, Baba Tegh Singh, which took place at his residence at Unnah.

At Daoon, there is the shrine of Baba Jwahar Singh Sodee.

At Gadgunga, there is the shrine of Uhadah Singh Sodee.

At Gadwal is the shrine of Guroo Ram Race, where he died.

The offerings of these shrines are taken by the people who read the Grunth there, and offer prayers for the donors.

Notes, principally Geological, across the Peninsula of Southern India from Kistapatam, Lat. 14° 17′ at the Embouchure of the Coileyroo River, on the Eastern Coast, to Honawer, Lat. 14° 16′ on the Western Coast, comprising a visit to the Falls of Gairsuppa. By Captain Newbold, F.R.S., M.N.I. Assistant Commissioner Kurnool, Madras Territory.

Kistapatam. Kistapatam is the port of Nellore, from which it lies about 15 miles S. E. It is situated on the Coromandel Coast a short distance from the sea, and at little more than two miles North of the mouth of the Coileyroo or Condaleyroo river, in about Lat. 14° 17'. N. It stands at the edge of a low sandy flat which, though now dry and exposed, appears during the monsoon to be overflowed by the river freshes, and probably once formed a back-water or lagoon communicating with the sea to the N. near Toolypaliam, and with the embouchure of the river near another Toolypaliam to the South. Sea salt is here manufactured. The physical aspect of the adjacent country is that of a flat, sandy, maritime plain, broken near the sea by an irregular line, following the indentations of the Coast, of low dunes of fine sand, by which the travellers' bungalow on the S. bank of the river is surrounded. The sand a little N. of this abounds in granules of magnetic iron, some of which appear to be titaniferous. The understratum of the sand observed here, and in some wells a few miles to the South of the river proved to be greenish or bluish black clay, or tertiary clay of Coromandel, with pelagic shells similar to that underlying Madras, Pondicherry, and the alluvial plain of Masulipatam.

Marine Sand Dunes. The sand dunes near the river had a S. W. direction, and rose about 50 feet above its bed. The ripple marks

them up with loose sand.

caused by the currents of air on their surface resemble those caused by currents of water, and the N. and S. direction of their major axis shows the Easterly and Westerly course of the late or existing prevalent winds. Their Eastern sides have a sloping direction; falling off rather abruptly to the West at about an angle of 45°, indicating that the wind which raised them blew from the E. On the surface were scattered here and there shells and fragments of shells blown up from the beach. The footsteps of waders, and other aquatic birds

These, together with the ripple marks, marine shells, and the elevation of these moving sands, form an interesting example of the manner in which strata of aqueous sub-marine origin may be imitated by the simple action of the wind on loose sand. Consolidation, and a more distinct stratification alone are wanting to convert these heaps into a fossiliferous ridge. The sand is often bound together by the long interlaced roots of grasses, &c.

could be occasionally tracked where the wind had not again covered

Calorific action of sun's rays on surface of Sand Dunes. At 5 P. M. sky clear, slight breeze just perceptible; the thermometer placed on the sand and freely exposed to the sun's rays indicated a heat of 100° 3'. Simply suspended in the air, about 12 feet above the surface of the sand, equally exposed to the sun's rays, it stood at 78° 5'.

Nocturnal Radiation from surface of Sand Dunes. The radiating powers of the sand dunes are considerable. At 3 A. M., night nearly calm, sky clear, the thermometer shaded from radiation, and placed on a table about four feet from the ground, stood at 67°. Placed on the grass and freely exposed bulb thinly covered with a little white wool, it fell to 65.5°. But on the surface of the sand dunes it fell to 62'. The sand is fine and quartzy.

As ærial stillness is one of the conditions necessary to the full refrigerating effects of radiation, it is likely that on the coast, which is hardly ever free from currents, however slight, resulting from the regular alternations of the land and sea breezes, the differences of temperature obtained by radiation will hardly ever be so great as the table-lands of India. The lulls between the land and sea breezes perhaps present the most eligible times for such experiments.

The temperature of the water of the wells is not far from what may be the mean average temperature of the place, viz., from 80° 2' to 81°. The bed of the river near Kistapatam is apparently about 500 yards broad, and sandy. A bar of sand obstructs the mouth, against which the surf beats in white breakers. The Collector's bungalow stands on the N. bank of the river.

Nellore. Circumstances prevented my examining the tract between the sea at Kistapatam and Nellore; but as far as could be judged from rapidly passing over it, it resembles in flatness (sloping gently seawards) the rest of the maritime plains of the Coromandel Coast, and abounds with small tanks. At Nellore the usual granitic and hypogene rocks of this coast are covered by beds of laterite, which are seen in cliffs about 16 feet high fringing the Pennaur river. About three or four miles from Nellore, on the Northern bank of the river, quarries of the laterite occur at the village of Kohor, in a deposit of this rock about 20 feet thick near the tank. Both at Nellore and the surrounding villages, it is extensively employed as a building stone, and in other repairs of the roads. Blocks, about one foot thick and two long, are sold at the rate of 12 for the rupee. Small springs are seen oozing out at the bases of the laterite cliffs on the S. bank of the river at Nellore. These cliffs are divided by perpendicular and horizontal seams; the rock composing them is less quartzy than the Kohor laterite. vertical fissures I observed fragments of earthenware broken by the natives in coming for water. These bits of pottery often become impacted in a lateritic alluvial cement, which must not be mistaken, as has been the case, for the true laterite, and hence its origin ascribed to the recent or historic period. Some of the oldest pagodas and structures in South India are built on this rock. laterites of Nellore and Kohor consist of a rock resembling the Malabar laterite, but containing more angular fragments of quartz. The surface of the laterite is often covered by a modern lateritie debris, more or less consolidated, which must not, as said before, be confounded with the true laterite.

As in the Beder laterite the water often passes from the surface of these cliffs by the tubular cavities in its structure which are enlarged, emptied of their clay and lithomarge, and modified by its passage downwards, until stopped in part by the clayey barrier it has assisted to accumulate. The water here forms reservoirs, and in overflowing finds its way out by fissures in springs. The bed of the Pennaur near Nellore is sandy, and apparently about 800 yards broad.



From Nellore by the North bank of the Pennaur to the base of the

Eastern Ghauts.

Sungum. From Nellore by Kohor the laterite may be traced westerly to the vicinity of Dovoor, resting on the granitic and hypogene rocks about nineteen miles W.N.W. from Nellore. At the Sungum, or confluence of the Pennaur with the two small streams of the Bogheyroo and Berapeyroo, the first rocky elevation is seen since quitting the coast about twenty-nine miles distant, and nearly midway between the sea and the Eastern Ghauts. It appears as a short range abutting on the Pennaur river, and running N. by E. to about the distance of two miles. It is composed, at the village of the Sungum, of a massive quartz rock in indistinct stratification, cleft occasionally, like the laterite, by intersecting partings and vertical fissures which divide the rock into parallelograms. The planes of the former have a dip of about 5° towards the East: the vertical fissures run irregularly, but the greater part have a direction of N. by W. This quartzy rock passes from opaque and granular, to compact, translucent chert, of various shades of red, brown, green, and white. It contains disseminated scales of mica of a golden colour, which glitter like those in avanturine, and nests of brown iron ore.

If the marly horizontal partings are really the planes of stratification, it may be inferred from its conformability that this quartz rock does not belong to the hypogene series which is seen in highly inclined beds near its base, penetrated by veins of granite (as seen at Pollium, a village between Dovoor and Sungum,) but that it is an altered outlier of the sandstone mural crests which are seen from this on the Western horizon capping the granite and hypogene schists of the Eastern Ghauts.

A glimmering hornblende schist, and gneiss veined with granite, with a white mica replaced here and there by schorl, are found at the bases of the quartz hills of Sungum.

A cluster of Hindu temples, the principal of which is dedicated to Iswara, as at the holy Sungums (or confluences) of the Kistnah, Bhima, &c., surrounded by a lofty wall, crowns a rugged mass of this rock that projects from the main ridge into the sandy bed of the river, which at this season of the year presents a dreary waste of sand,

apparently marly, a mile in width, through which a slender crystal stream of water threads its way towards the sea. In front of the temple gates stands a granite slab, bearing a Sassanam, or inscription, in Nagri and Telugoo, almost buried in drifted sand. The emblems of eternity, (or rather durability)—the sun and moon—were engraven on the corners above the inscription. The priests of the temple are brahmans of the Smartal sect, whose Suami or bishop is the powerful Sencra Bharti. The remains of an old aqueduct are seen at a little distance from the Sungum. The village itself contains about 400 houses, though it appears formerly to have been a place of greater wealth: a few cotton cloths are manufactured here. The staple articles of cultivation are rice, baggi, or juari, and a little indigo.

Temperature of the Pennaur river. The temperature of the water in the Pennaur was 77.3°; of the springs 78.2° at 4 p. m. Temperature in open air at the time 82°.

From the Pennaur to Jummaveram and Copper district of Ganypenta. Leaving the North bank of the Pennaur at Sungum, the road
lay in a N. by W. direction to Jummawdram, or Jummaveram,
distant about ten miles from Sungum. The rocks here are still the
hypogene schists, chiefly garnetiferous hornblende schist, and gneiss,
with large veins of whitish quartz, the fragments of which are scattered
over the uncultivated surface of the plain. The soil is reddish, both
sandy and clayey, and rests either on a substratum of kunker and
detritus of rock, or on the rock itself. Two out of the four wells at
Jummaveram are saline:

The hypogene schists penetrated by trap and granite, extend from Jummaveram to Ganypenta or Gurumanipenta, a village about twenty-three miles N. N. W. from Jummaveram, about thirty-three miles North of the Pennaur about the same distance from the sea, and about twenty-eight miles from the base of the Eastern Ghauts.

This village is situated in the midst of the copper mining localities described in a paper published by the Royal Asiatic Society in their Journal.

From Ganypenta to the E. Ghauts. Proceeding from Gurumanipenta in a S. W. direction towards the entrance of the Dorenal Pass over the Eastern Ghauts, the surface of the great plain hitherto travelled over becomes more rugged and broken up by rocky elevations,



till at length the base of the Ghauts is reached near Udigherry. hypogene schists, penetrated by granite and dykes of basaltic greenstone and overlaid by patches of kunker, continue up to the base of the Ghauts. Mica schist is seen at Samulraygudda, about four and a half miles E. S. E. from the town of Udigherry, and also about seven miles farther to the S. W. at Timmapolliam with quartz rock. Several of the hypogene spurs in the plain are capped with this quartz rock, which is usually of a light reddish colour passing into greenish grey, and white cherts. It is evidently altered sandstone. The hypogene schists are in great confusion at the base of the Ghauts, and in one place I observed the mica schist dipping at an angle of 41° to the W. i. e. towards the great line of dislocation. In some places they are but little inclined; in some vertical; while in others they appear to have been reversed, and folded back upon themselves, the upper parts of the flexures having disappeared in weathering or by denudation. Hence they have the appearance of alternating in a reversed order to that in which they usually occur, viz., the gneiss lowermost in the series. This occurs in most other hypogene areas of South India, and care should be taken to ascertain in such disturbed regions the true order of superposition from the horizontal or less inclined beds in the neighbouring districts less disturbed, and where there is no likelihood of inversion or folding back of the strata. These phenomena, though written in plainly legible characters on the faces of the gigantic escarpments of the Alps, must in Southern India generally be patiently traced out, letter by letter, amid the jungle and debris which usually obscure their features.

Eastern Ghauts. The Eastern Ghauts, in the vicinity of Udigherry, and the Dorenal Pass, have an altitude, approximatively obtained by a rough trigonometrical measurement, of about 700 feet from the maritime plain at their base, which is from 60 to 70 miles broad, its surface roughened by spurs from the Ghauts, and a few occasional rocky clusters and detached hills.

The Ghauts here have usually their escarpments, or steepest acclivities facing towards the East. The lower portions of the hills, which are composed of mica slate or gneiss, have usually a much less abrupt and steep descent than the sandstone, which often caps them in mural cliffs and hog-backed ridges. The line of junction of the two rocks

is thus often plainly visible in mountains many miles distant. The hypogene schists seldom attain a height of above 400 feet; the higher portions are sandstone. The sandstone, in the localities where I examined it on the heights overlooking the Dorenal Pass, had much the appearance of quartz rock passing into chert or hornstone, of various light shades of red, brown, green, blue, black and white.

Pass of Dorenal. This break in the Easternmost chain of the Eastern Ghauts is about four miles in length, general direction W. by N., and is evidently a transverse valley of fracture, passing nearly at right angles with the direction of the strata, and with that of the longitudinal vallies. The Northern side is abrupt and craggy, while the abrupt features of the Southern flank are more rounded and softened down. Its bottom has an irregular surface, occupied by angular rocky debris, the wreck of strata once continuous, and is now partially covered with both arboreous and shrubby vegetation. The ascent from the East, partaking of the general character of the Ghaut elevation, is steeper than the descent to the West; but it is every where passable for loaded carts, and is one of the best channels of commerce from the maritime plains of Nellore and Ongole to the more elevated districts of Cuddapah, Bellary and Kurnool. The best sort of cart adapted for this hill transit is that with the narrow sharp wooden wheels girt with strong iron fellies, and having axles revolving with the wheel. I saw about fifty return carts, laden with empty indigo boxes, returning from the town of Nellore to the indigo factory at Budwail in the Cuddapah district. Five hundred Lumbari bullocks, laden with salt, the manufacture of the coast, were jogging merrily on, to the music of their own bells, with this high-taxed necessary of life, into the interior.

Valley of Budwail. From the Pass of Dorenal the traveller descends by an easy slope into the longitudinal valley of Budwail, which is crossed in a W. N. W. direction to the Western and principal chain of the E. Ghauts. This fine valley has an almost S. direction inclining slightly to the E., and extends from the Kistnah beyond Cumbum on the N. to Tripety on the S. with some interruption from occasional cross lines of elevation and fracture, passing a little East of Sidhout to the cross fracture forming the valley of the Pennaur; whence its course may be traced southerly by the channels of Cheyeyroo and Goonjna streams, by Chitwail, Codoor, Baulpilly and Curcumbady.

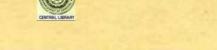


On the line of the cross valley of the Pennaur near Sidhout a considerable subsidence, or sinking down of the surface, appears to have taken place; as near this point we see both the Northern and Southern lines of drainage of the longitudinal vallies of the E. Ghauts, viz. the Cheyeyroo, the Toomall and Sagglair, converge and empty themselves into the Pennaur, easterly through the cross fracture of Sidhout to the sea. The general breadth of the valley of Budwail North of the Pennaur, is about eleven miles. From Poormaumla on the N. to the Pennaur it is sub-divided into two vallies by a central range of hills, which passes by the town of Budwail; the lowest parts of these vallies are marked by the S. courses of the Toomall in that to the East, and by that of Sagglair in the valley to the W.

In the valley of Budwail the Cuddapah limestone with its associated argillaceous shales of different shades of red, chocolate, white, yellow and green, are first seen, the latter predominating. The central range consists chiefly of sandstone based on these shales, which are often denuded, and appear in the vallies between ridges capped with insulated massive layers of sandstone and quartz rock several miles asunder.

Westernmost ridge of the Eastern Ghauts. The Western, or principal ridge of the E. Ghauts is crossed by the Oothoomnagoo and Jungumrazpilly Passes. The latter is perfectly practicable for bandies. Leaving my baggage to go round by the Pass, I ascended the Ghauts by a sheep track, to the lead mines of Jungumanipenta, and descended to those of Buswapoor on the Western flank of the Ghauts. These mines have been previously described in a paper published by the Royal Asiatic Society. Suffice it here to observe, that the lower and modern elevations of the Ghauts are composed of slates and shales associated with the limestone; the highest ridges and peaks are capped and crested with sandstone passing into quartz rock. The limestone abounds with chert and hornstone; its shales are usually reddish, chocolate, green, white and ochreous, and interstratified with arenaceous, ferruginous, and calcareous bands passing into dark quartzose slates; petrographically speaking these resemble those of our Devonian series, but no traces of fossils are observed in any of these rocks.

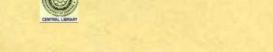
Nundialempett. This village is situated about one and a quarter koss Westerly from the lead mines of Baswapur, and stands on the right bank



of a stream that flows from the neighbouring Ghauts southerly along their base into the Pennaur, called the Conda Nulla. On a ridge overlooking the tank stands the trigonometrical survey station of Mookandoo. The soil is alluvial and reddish, with calcareous matter intermixed, resting usually on a thick substratum of kunker imbedding nodular brown iron ore and fragments of the subjacent and adjacent rocks, viz. slaty argillaceous limestone and sandstone. The cultivation is solely of that description termed Moongari and garden. The aspect of the country at this western base of the Ghauts is at first undulating and picturesque, the undulations merging to the westward in the great regur plains of Dhoor and Cuddapah. The clumps and groves of shady tamarind trees, with which its surface is studded in the sub-ghaut plains, give it a park-like aspect. The ruins of a small fort, with the remains of a large cavalier in the centre, stand close to the village, and are said to have been built by one of the Cuddapah Nawabs.

Jummulmudgoo. Crossing the great plain of Dhoor, which is based on the diamond limestone, and divided by the Koond river, which runs Southerly down its centre to the Pennaur at Camlapoor, the large village of Jummulmudgoo is reached. It stands on the left bank of the Pennaur a little to the East of the emergence of this river from the gorge of the Gundicotta hills, which form the Western lip to the Pennaur basin, girt in on the South by the Wontimetta and Poolvaimla ranges, and to the East by the Eastern Ghauts, through which it escapes to the sea by the transverse break of Sidhout. The approximate height of this basin above the sea towards its centre, as indicated by the boiling point, is 800 feet.

The rock in the bed of the Pennaur and on which the village stands, is the blue variety of limestone above mentioned, often approaching French grey in lightness of colour; it dips slightly towards the E. or N. of E. The village is rather noted for the brilliancy and permanency of its dyes, which are fixed by washing and steeping the cotton printed cloths in a saline well, the water of which rises up from the limestone in the heart of the village. The surface of the water was thirty-two and a half feet below that of the ground, owing to the dry season; its temperature three feet below the surface 73°, a lowness ascribable to the constant evaporation caused on the surface and sides



by the washing and the drying of cloths. Temperature of air in the shade at 5 p. m. 85°. The principal saline ingredient, if I may judge from the incrustations in the fissures and seams from which the water springs, is muriate of soda. Many of the seams are occupied by a greyish friable earth consisting of disintegrated limestone mingled with this saline residue left after evaporation of the water.

There is another brackish well in the town, but it does not answer the purpose of the native dyers so well as this. The water of the other well is perfectly sweet. One which I visited between the saline spring and the river, lies at the depth of twenty-three feet from the surface, with a temperature of 75°, six and a half feet below the surface. The time has now passed when the occurrence of common salt, the mineral chloride of sodium of chemists, in distant regions was held to be sufficient evidence of the existence there of the new red sandstone. It occurs in the oldest stratified rocks of America, in the coal measures of England, the lias of Switzerland, and all over the hypogene and granitic area of South India.

Jummulmudgoo contains about 3,000 inhabitants, the greater portion of whom are Kunbis speaking Telinghi, a language which continues from Nellore to about the vicinity of Gooty and Kurnool, where it meets the Canarese of the Western provinces, and near Beder on the N. W. with the Mahratta. I found that it meets with the Tamul of Madras and the Southern provinces at Sriharicotta, a village about fifty miles North of Madras, near the old limits of the Andra-des, or Telinghi country, and the Dravidame-des. Jummulmudgoo was formerly a place of some importance under the Annagundi or Bijanugger princes, and the Chetvail rajahs. It subsequently shared the same fate as the rest of their dominions South of the Tumbuddra. It is the burial place of Sidi Miyan, brother of Halim Khan, Nuwab of Cuddapah in Hyder's time. Funeral rites in memory of him were performed during my encampment here. The remains of the Diwan-khanah and palace of the Cuddapah rulers, and a small fort without a ditch, still exist.

Pass of Gundicotta. Previous to describing the defile through which the Pennaur flows Easterly from the plain of Tarputri into that of Cuddapah, it will be right to mention that the ridge, through

which this transverse fissure occurs, commences a few miles South of Kurnool, on the S. bank of the Tumbuddra on the N. W., and runs Southerly through Dhone, and the Eastern borders of Banganpilly and Gooty by Munimudgoo, whence the direction is S. Easterly by Owk, W. of Ollavaconda, Juggernatgooda, the Timnainpetta tank, and Jummulmudgoo, to the hamlet of Cullamulla, about thirteen miles S. E. from Jummulmudgoo, and about fifteen miles from the fissure of Gundicotta.

The direct breadth of the range where intersected by the fissure is about five miles, and its extreme height apparently not more than 600 feet; the extreme height of the precipices on either side, ascertained trigonometrically, is not more than 250 feet, and often not more than 80 feet. The general direction is E. by N., though in its course through the hills it describes two salient and two re-entering angles. The bottom of the fissure is flattish, and occupied completely by the sandy bed of the Pennaur. The breadth is usually from 100 to 300 paces.

In Hamilton's account, taken from Heyne, Rennell, &c., the Pass of Gundicotta is described as a break or chasm in the mountains, which "appears to have resulted from some violent concussion of nature, as it is very narrow, and the opposite sides almost perpendicular." Induced by this description to suppose that some interesting dislocation of the strata on a large scale had taken place, I examined narrowly the sides of the Pass. Entering it with the Pennaur from the West, from the wide sandy waste caused by the confluence of the Chittravutty river with the former stream, the sides of the opening present steep slopes of sandstones thinly covered with a sandy soil and scattered bushes, among which frolicked troops of gay monkies. About the middle of the Pass, under the walls of the fortress of Gundicotta, which crown the Southern cliffs, the sides are precipitous masses of sandstone divided by fissures into vertical pinnacles, assimilating ruins, and which are occasionally undermined by the force of the monsoon freshes and precipitated into the bed of the river.

The sandstone strata forming the precipices on each side exhibit no marks of dislocation or violent disturbance. They dip at an angle

dip of the beds can be traced from one side to the other.

No ledges supporting beds of rolled pebbles could be found on the faces of the cliffs, or other marks of the rocks having been worn by watery erosion down to the present channel.

It is therefore reasonable to infer that this singular fissure has been mainly occasioned by contraction of the mass during consolidation, and not by "a violent convulsion of nature or erosion;" although there is little doubt that its width has been since increased and shape modified by the washing of the river floods, as is evident from the precipitated debris from the sides which occasionally strew the bed. Smaller parallel fissures are observable in the cliffs on each side, one of which has formed the cave called by the native guides, "Pandi Gawi."

The bed of the river is filled with sand and fragments of sandstone, and occasionally of its associated blue limestone, to so great a depth as to render an examination of the downward continuation of the fissure impracticable.

The great depression of the bottom of the fissure is clearly shown by the sudden manner in which the waters of the Pennaur are deflected into it from the S. E. course they were pursuing along the Western flank of the hills, and by the confluence of the Chittravutty at this point.

The river during the rains is said to rise to the height of seven or eight feet in the centre of the Pass.

The rock composing the cliffs is for the most part of a faint reddish, compact sandstone approaching quartz rock, in tabular masses of great thickness, though sometimes interstratified with argillaceous seams like the sandstones of Gokauk on the Gutpurba, which are usually of a reddish white and buffy colour.

The faces of the sandstone cliffs exhibit bands of a pale, green, redand white, which conform to the stratification.

The cliffs sustain a rocky table-land, the surface of which is frequently covered with a crust of laterite varying from a few inches to several feet in thickness, and which is also deposited in the fissures and seams of the subjacent sandstone.

The tabular surface of the latter rock, where denuded of this lateritic crust, is often divided into parallelograms by intersecting fissures and joints.

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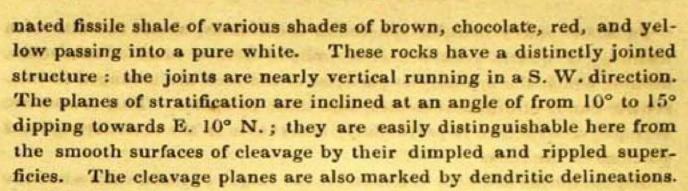
In some places nodular spheroidal concretions, about the size of a nutmeg, of quartz rock are seen imbedded in a mass of sandstone, around which the arenaceous particles of the rock are arranged in concentric bands of different shades, like those in agates. This concentric segregative structure is particularly observable in the more ferruginous portions of the rock.

Ripple marks are very common on the larger exposed surfaces of the sandstone strata. The table-land on the summit of the hills is a wild looking tract, covered with long grass and bush, which is burnt every year and produces good crops of turmeric.

Fortress of Gundicotta. The cliffs on the South of the Pass, and near its middle, are ascended at the ruins and tombs of Allahabad by a steep zigzag path to the once celebrated fortress begun by the Hindu sovereigns of Bijanugger, greatly enlarged by Aurungzebe's and Kuttub Shah's famous General, Mir Jumlah, and added to by Hyder and Tippoo.

After the fall of Bijanugger in 1564, the fort was still retained by Nursing Raj, nephew of the slain Hindu monarch Ram Raj, from whom it was taken after a severe siege by Mahomed Kuli Kuttub Shah, king of Golconda, or rather by his General Mir Jumlah. It was subsequently annexed to the Patan government of Cuddapah by Neknam Khan, and afterwards given up to Hyder when he reduced this part of the Balaghat. It was ceded to the British by the treaty with the Nizam in 1800. The fortifications are extensive, and contain a handsome Chulrar Minar, military magazine, and mosque, a small town, and the ruins of a temple to Mahadeo; to whose shrine Ferishta tells us 100,000 Hindus of Bijanugger used to make an annual pilgrimage and offer gifts of great value. Besides the two paths by Allahabad are the other approaches to the fort, viz. one by an easy ascent from Jummulmudgoo on the East, and the other from Chittywanripilly by a steep and rugged ascent just practicable for horses.

Figure-stone quarries of Reddadoor. Proceeding Westerly from the Pass of Gundicotta, I passed along the plain on the left bank of the Chittravutty river to the hill pagoda of Reddadoor, nearly eight miles W. by S. from the base of the Gundicotta hills. Limestone, passing into argillaceous shales and schists, constitutes the rock in the plain. The ridge of Reddadoor is about a mile in length, running in an E. by S. direction: it consists of argillaceous slates alternating with a finely lami-



This ridge has been penetrated by a large dyke of basaltic greenstone, running nearly E. and W., and branching in a N. and S. direction. It is seen outcropping along the whole extent of the S. W. base. At the N. E. base both branches disappear in the plain. The basalt is also seen bursting through the strata at the saddle-shaped depression on the summit of the ridge, where it has both a globular and prismatic structure, the prisms pass into the globular form by the exfoliation of their angles, and I have even observed small spheroidal nuclei in the exfoliated coats, which are in turn subjected to concentric exfoliation. The dyke, like all others in this formation, does not overspread or cap the rocks on its sides, but ends abruptly at the surface. Towards the centre, like most volcanic dykes, it becomes crystalline and porphyritic, imbedding crystals of both whitish and pale green felspar with a few of hypersthene and foliated hornblende. Acicular augite is seen glistening in the more compact and quickest cooled parts of the dyke, and occasionally cubes of iron pyrites. salt melts easily into a greyish black glass.

The shale in contact, both in the plain and on the saddle of the ridge, is either hardened and rendered massive, compact or ferruginous, or is broken up, by crystalline forces apparently, into a number of laminæ often distinctly prismatic, and exhibiting dendritic marks on the planes into which they readily split. At the base of the hill the basalt and indurated shales assimilate so much at the junction line that it is difficult to distinguish them; the shale has become dark and hornblendic, and the basalt has acquired something of the fissile structure of the shale. A similar phenomenon is observed in the metamorphism of the hypogene rocks of Southern India, where the granite near the point of contact acquires the structure of gneiss, and the gneiss becomes in turn more granular, massive or granitoidal. The phenomena presented by granite and basaltic greenstone at their contact with metamorphic or other stratified rocks are extremely interesting;

and no country in the world, perhaps, affords better opportunities for their study than S. India. Some of the fissures of the dyke on the ridge of the hill are filled with calc spar, and many of the loose blocks encrusted with the same mineral and compact reddish kunker. Thin seams of nephrite occasionally intervene between the basalt and its walls; and the limestone associated with the slates has in some instances been converted into chert after assimilating calcedony in texture and colour.

Where basaltic greenstone and granite, or other plutonic rocks have extended on a great scale, we generally find not only a great tendency to crystalline and mineral development, but a segregation of the ordinary components of the rocks of the heated area, of such magnitude as to be at once apparent in the physical aspect of the country in large beds and ridges of quartz, iron ore, or quartz strongly impregnated with iron, felspathic clays, &c.

But to return. At the Southern base of the ridge the shales acquire a massive structure, and form a soft lilac tinted rock speckled with green, with a slightly soapy feel and easily sectile, which melts before the blow-pipe per se into a pearly glass. It is here quarried and carved into images, figures of deities, &c., which are exported.

I had a very neat representation of the Avatars of Vishnu, executed on a large slab of this material which, though I have given it the name of figure-stone, by no means resembles the agalmatolite of China, used for similar purposes.\* Much of the water rising through the fissures of the rock around the base of the ridge is impregnated with muriate of soda; and further West to Ganlapaud the plain is intersected with trap dykes penetrating the grey limestone and its associated shales, which are often greatly altered and silicified. The general direction of the strata observed was E. S. E. and S. E. and dip N. of E. Hence, the plain to the base of the Rayelcherroo hills is chiefly limestone and associated shales and schists covered with regur. South of Rayelcherroo the limestone becomes of a waxy texture, compact, of a conchoidal fracture, veined and dotted with delicate shades of green, yellow, red, and imbeds pyrites. It rises into irregular hills and ridges, alternates with sandstone, and sandstone conglomerate. The hills become still more confused and jumbled, as the

<sup>\*</sup> The Agalmatolite is wholly infusible. This is probably one of the many varieties of steatite.— Eps.

junction line with the granite is approached about six miles E. of Gooly, and the development of quartz is seen on the strange shaped peaks and mural ridges near the granite line. These hills, which form a most rugged and picturesque country, constitute the main and westernmost ridge of which the Gundicotta range just passed is a spur running down into the great plains of Tarputtri and Dhoor, and terminating abruptly as we have seen at Cullamulla, a few miles N. of the Travellers' bungalow at Chillumcoor.

These westernmost ridges instead of following the S. E. direction of the Gundicotta spur at the point of bifurcation between Banganpilly, Owk, Munimudgoo, and Piapully, continue their nearly N. and S. course from the banks of the Tumbuddra near Kurnool by Gooty to the vicinity of Anantapore in the Bellary district, whence they turn Easterly to the S. of Cuddapah, where they join the Eastern Ghauts; thus forming with the "impenetrable unsurveyed" spurs projecting westerly from the Eastern Ghauts along the S. bank of the Tumbuddra, to the North, the most complete basin perhaps in Southern India, embracing the great Regur plains of Cuddapah and Kurnool, and the beds of the Pennaur and its tributaries the Khoond and Chittravati. The Pennaur, which rises near Nundidroog, flowing Southerly from these watersheds of the elevated plateau of Mysore, is deflected suddenly by the great granitic outburst near Gooty from its farther course Northerly towards the Tumbuddra, which it would have certainly joined had not this rocky barrier compelled its stream to seek an Easterly course through the hilly edges and fertile plains of this sandstone-girt basin, to the Bay of Bengal. This basin and its rocky mountainous fringe, which consists chiefly of the diamond sandstone and limestone, comprehend the richest diamond mines of the former kingdom of Golconda, iron in great abundance, and the richest and almost only mines of galena in Southern India. It is composed for the most part of sandstone conglomerate, sandstone, arenaceous schists, limestone passing into silicious schists and into argillaceous schists, and shales of various shades, reddish brown, chocolate, and pale green prevailing. It was thought by Malcolmson, Heyne and others, that the formation consisted of the limestone underlying a sandstone and conglomerate imbedding the diamond. So far this is the case, but I have discovered on the Eastern limits from Juggernath S. of Kurnool to Gooty, and at Mudelaity



near Banganpilly, that beds of sandstone and sandstone conglomerate, reposing immediately on granite, underlie the limestone; and that the limestone must have been consolidated prior to the deposition upon it of the upper sandstone and its conglomerates, since in the latter I have found imbedded pebbles from the subjacent limestone. The formation, then, consists of an upper and lower sandstone and conglomerates, and the intervening limestone and associated shales.

Leaving this granite based chain, the great frontier plains of the Ceded Districts and Mysore are crossed to the hill fortresses of Raidroog, and Chittledroog, where we find magnificent outbursts of granite and other plutonic rocks, rising abruptly and irregularly from the nearly vertical hypogene schists which have suffered every variety of flexure and disturbance.

Chundergooty Droog. The granite, on which stands the Droog or hill fort of Chundergooty, rises into two lofty peaks, the steepest sides of which are nearly parallel to those of the Western Ghauts, sloping off towards the East and South. The joints in the lower ranges of laminar granite, or granitoidal gneiss, are divided by vertical fissures giving them much the appearance of vertical strata, as remarked by Christie in his paper on the Geology of the South Mahratta country. The Droog, it is said, was built in the time of the Pandion kings, and strengthened by Hyder. The village in the base consists of about fifty houses under a Killadar, with twenty men. Coffee is cultivated at Sindli, a village about a koss distance, and iron, obtained from mines at a short distance, is exported hence to the West coast.

From Chundergooty to Siddapore, the road for the latter part lies over the undulating and hilly tracts on the slopes of the Western Ghauts, which gradually become more and more covered with wood. Granite, and the hypogene rocks, intersected by dykes of basaltic greenstone and overlaid occasionally by patches of laterite, are the only rocks observed. About three koss distance from Siddapore lies the ancient and decayed town of Bilghy, formerly the capital of the Santavi-raya Rajahs. Siddapore is now the Kusbah town of the talook. It contains between 200 and 300 houses, inhabited chiefly by Lingayats speaking Canarese, Concanis, Haiga Brahmins and Mussulmans. The staple articles of cultivation are rice, betel-nut, cardamoms, and black pepper. The three last are exported chiefly to Mysore, the Ceded Dis-



tricts, and other parts of the interior; and to the native port of Kompta on the Western coast, passing down the Gairsuppa or Hossulmucki Ghaut and the Hoss Ghaut, on bullocks. Iron is procured in the neighbouring hills.

Ridge of the Western Ghauts. Between Siddapore and the Falls of Gairsuppa, the highest edge of the Ghaut ridge is crossed; the watersheds of the table-lands to the Eastward, and of the mountain-streams that rush in the monsoon with great violence down their precipitous sides and across the narrow strip at their base into the Indian sea.

The Warda was the last stream of any size observed flowing Easterly. The Ghauts descend to the Westward from this anticlinal axis by short and steepish declivities and irregular terraces. The surface rock is principally a quartzy lateritic conglomerate, overlying the hypogene schist, principally hornblende schist, gneiss, mica, chloritic, talcose, and actynolitic schists, which are occasionally seen basseting out. The more ferruginous of these schists disintegrate into a compact red clay, in which are seen veins of quartz continued from the subjacent rocks, still maintaining their slope and direction.

The soil is red and clayey, and in the rains greasy and slippery in the extreme, owing probably to the decayed talc and mica; garnets abound in it.

Physical aspect W. Ghauts. As the Ghauts are approached from the plateau of Mysore, the flat plains begin to undulate, rising all the time to the Westward, and as the traveller progresses the undulations become shorter and more perceptible, till the highest ridge of the Pass is attained. The height of the rocks on either side of the path is generally concealed by forest.

The nature of the vegetation that clothes the surface too suffers a manifest change, and becomes more profuse. In place of the clumps of mangoes and tamarind, which diversify the plains with their hedges and thickets of Aloe, Euphorbia, Cacti, Acacia, Cassia, Parkinsonia? we see graceful clumps of bamboo, the broad-leafed Bilami, Maræa Chinensis, the leaves and root of which are supposed to be specifics for snake-bites, and the Dudol yielding excellent timber. The Pulas (Butea Frondosa) with its brilliant orange-red flowers yielding a beautiful yellow dye known to the preparers of the coloured

balls used in the festival of the Hooli, and its broad thick leaves which serve the Hindu as plates and dishes, the laurel-leaved Gorui (Ixora parviflora) which furnishes torches for the traveller. The Mutti tree (Chuncoa Muttia) the ashes of which, particularly the bark, containing much potash, are used instead of chunam, by betel-chewers: the tree also affords good timber. Here and there a magnificent banyan throws down its hundred arms, and the sacred Peepul rears its verdant head; while further in the jungle grows the sandal, supplying the fragrant oil and wood for which this part of the Ghauts is fa-. mous. The Sissoo (Dalbergia,) and Terminalia alata, excellent timber trees; the hard and lofty teak itself, and the Hopea decandria, the wood of which is harder and more durable even than that of the teak; the sago and areca palms, the jack, and the cashew nut. The wild cinnamon (Cassia lignea) grows in great abundance near the Falls, and the underwood glowed with the beautiful blossoms of the scarlet Ixora, sacred to Siva and Krishnu, while the air was redolent with the fragrance of the wild jasmine.

The vegetation of the Ghauts strongly reminded me, in its regular and smooth bust-like outline, of that which clothes the lovely and ever verdant Malayan Islands to the water's edge, similar loranthaceous parasites festoon the loftier trees of the forest, and the jungles abound with Myrtaceæ and Laurineæ. The Ixoras and Eugenias are common to both, and the cultivated forest clearings yield abundant supplies of black pepper, cardamoms, areca, coffee, plantains, &c.

Falls of Gairsuppa. - Accompanied by my friend, Lieut. White, 47th Regt., I arrived from Siddapore at the thatched bungalow of Korkunni, early in August, a little after midday. The bungalow stands in an open part of the forest, about one and a half mile from the Falls, the sound of which however did not yet reach us. Dripping with rain, our shoes full of blood from the jungle leeches that had fastened on our legs, and tolerably well fagged from a muddy march chiefly on foot over clayey and rocky ascents and descents, covered with dense thicket, we could not restrain our curiosity; but leaving our servants to prepare breakfast, with a guide trotting in front, we hastened towards the Falls along a narrow path winding through bush mixed with tall forest which clothes the banks of the Sarawati, for such is the name of the river that performs this stupendous lover's-leap

from the chains of the giant Ghauts into the arms of his ocean-rescued. Mistress-prolific Canara.

As we threaded the tortuous path, the rushing sounds of the rapids became clearly distinguishable from the shriller whistling of the wind, and the pattering of the rain among the leaves and branches of the trees.

On a nearer approach this rushing sound was suddenly drowned by the deep thunder, evidently of the Fall itself, which appeared to proceed from a great depth beneath the ground on which we walked, and which now was fairly felt to vibrate from the weighty shock. The air too became palpably colder, a phenomenon doubtless caused by the evaporation from the clouds of spray which canopy the Falls and adjacent banks.

Deceived by this sound, which still seemed afar off, into the imagination that the river was yet at a considerable distance, we unexpectedly emerged from the thicket upon the rapid immediately above the brink of the Falls, when the cause of this deception became evident; the din of the waters had been deadened by the peculiar shape, the immense depth, and confined dimensions of the chasm into which they were precipitated. Hence the ventriologuism of the cataract.

We now stood silent and astounded by the roar and rush:—amid the grey clouds of mist and spray the arrowy waters of the rapid were visible, divided into a multitude of currents by the rock masses against which they tumultuously dashed in their impetuous progress to the edge of the precipice.

Here, as the eye and ear follow its course to the main Fall, the rapid literally dies a sudden death; its clamorous voice is abruptly silenced, and it bodily disappears, as if by magic, in the bowels of the earth, or into the region of moving mist which curtained the chasm from the place we were standing on.

After indulging a short time in this magnificent spectacle—a gem set in lovely mountain and forest scenery—we scrambled over the muddy and slippery shelves of rock towards the edge of the principal Fall. The river was much swollen by the monsoon, but had been still fuller, as shown by the bruised and shattered forest trees which had

The Brahmins have a tradition, that the sub-ghautine maritime tracts of the Western Coast were raised from the ocean for their especial use.

been uprooted, borne down, and thrown in confusion with other vegetable debris on the rocks we had to cross.

Crawling on hands and knees—an operation rendered eligible by the then slimy surface of the rock and the painful effects of a score of tumbles—we contrived to reach the shelf of rock which completely projects over the margin of the chasm, and forms an admirable point of view. We lay down flat on the surface of this shelf, which slopes gently from the chasm, and drew ourselves up to its edge over which, as I stretched my head, a sight burst on the view, which I shall never forget, and can never hope to describe. I have since looked down the fuming and sulphurous craters of Etna and Vesuvius, but have never experienced the sensations which overwhelmed me in the first downward gaze into this (Hibernice,) volcano of waters:—for so it looks.

All thoughts of the picturesque, all pre-formed resolutions of subduing the exaggerated impressions likely to be produced on the imagination by such a scene, and reducing them by the sober checks of calculation of height, depth, velocity, bulk, &c.—at once vanished, and left the mind partaking in the tumultuous confusion and agitation going on. But it is the chaotic scene beneath that rivets with basilisk fascination the gaze of the spectator, and produces in some minds the dangerous impulse or desire of self-precipitation.

This impulse originates possibly in a sympathy existing between the human Mind and what is termed, perhaps inaccurately, "Inanimate Nature," which in its calm and beauteous state exercises so great a tranquilizing effect of certain minds.

Passive amid this activity, the spectator looks downwards into an apparently fathomless gulf of plunging waters, spray, uproar, and mist; first perhaps with a feeling of fear and giddiness, which rapidly vanishes, and the mind becomes not only reconciled to the incessancy and unvarying nature of these phenomena, but fascinated more or less by them. It was with great reluctance, and with an intense feeling of depression, that I withdrew my head drenched in spray from the brink of the precipice, to examine in detail other parts of the Falls. One might almost gaze for ever on this abyss in which a mighty mass of water appears eternally burying itself in a mist-shrouded grave. The clouds of spray which continually ascend heavenwards in slow and majestic wreaths, appear to typify the shadowy ghosts of the



entombed waters. The principal or Horse-shoe Fall is deeply located at the right bend of the ellipse formed by the entire chasm. Over it is precipitated the great bulk of the river, which fell over the edge with a smooth and graceful curve in one huge muddy mass, and descended in an unbroken sheet until lost to the eye in the volumes of spray below.

The Rocket Fall is on the left of the Horse-shoe, and, though insignificant in volume, is a cascade of extreme beauty, excelling those of Tivoli. This Fall after descending perpendicularly a great depth, encounters a projecting ledge of rock from which it glances with great velocity, whiteness, and brilliancy, forming in its descent the parabolic curve of a rocket, and sending off brilliant white jets resembling falling stars and tailed meteors.

The Roarer, so named from its noise, is nearer the Horse shoe than the Rocket, and larger in volume; it descends in two streams upon a shelf of rock, down the highly inclined surface of which they rush with much noise and rapidity in one mingled mass of foam. In the dry weather no less than six or seven other Falls are distinguishable. I observed a number of small rills which, after descending some distance, separated into threads: these, in descending, became gradually divided into drops and spray, and mingled with the ascending wreaths of mist, apparently never reaching the bottom of the cataract.

In order to ascertain the height of the principal Fall, we let down a plummet attached to about 1000 feet of rope; but it got entangled near the bottom of the precipice, and broke in our exertions to draw it up. Mr. T. Lushington, of the Madras Civil Service, informs me, that he had successfully measured it in the dry season, and the result of these measurements were as follow:—

And the second second second second	Feet.
From the top of the Falls to the surface of the water in the basin below,	888
Depth of water in the basin,	300
-Total,	1188 feet.

The sheet of water above the Falls was about 300 yards broad, (Mr. E. Maltby, of the Civil Service, informs me it is sometimes nearly 600 yards broad), and at least on average eight feet deep; current about six

or seven miles per hour. In the dry season it is scarcely knee-deep, and can be forded immediately above the Falls, with perfect safety, to the opposite bank, whence a path, partly hewn in the rock, leads to the basin and bed of the river below, impracticable or nearly so in the depth of the monsoon. There are many other cascades in Upper Canara seen glancing among the forest-clad heights of the Ghauts, but which are approachable with difficulty during the monsoon, for instance, those near Yellapoor, and Honeycoom, about three koss from Allawully.

To have a true estimate of the beauty of the Falls of Gairsuppa, they should be visited both during the monsoon, and when the water in the river is so low as to admit of their being viewed from below.

The rocks immediately beneath must present one of the most striking illustrations in the world of the eroding action of falling water, as
proved by the immense depth of the basin. To these must be added
the abrading effects of precipitated masses of rock. At the time of my
visit not less than 43,000 cubic feet of water, by rough calculation,
were falling per second into this vast rock basin.

The precipice, over which the water falls, affords a fine section of the gneiss and its associated hypogene schists, which dip Easterly and Northerly away from the Falls at an angle of about 35°. The gneiss is composed of quartz and felspar, with both mica and hornblende. and alternates with micaceous, talcose, actynolitic, chloritic and hornblende schists, imbedding (especially the latter) iron pyrites. These rocks are penetrated by veins of quartz and felspar, and also of a finegrained granite composed of small grains of white felspar, quartz, and mica. Christie is of opinion, that this rock is not so old a granite as the ordinary granites of India, and that this is the only locality in India where he has met with primitive gneiss. No sound geological proof, however, is assigned for this opinion. All the granites of India are of posterior origin to the hypogene rocks, which they have invaded and altered. Regarding the age of the hypogene rocks themselvesalways a most difficult problem to solve-we are still in the dark; nor does the fact of this granite being associated with the so-called "primitive gneiss," lead us to infer an origin more recent than the ordinary granites of South India.

The mass of hypogene rocks has evidently been worn back several hundred feet by the erosion and abrasion of the cataract; the softer



talcose and micaceous schists have suffered most. Mr. E. Maltby tells me, that an instance lately occurred of the manner in which the great Fall has receded. One of the crags composing the edge of the precipice gave way, and in its descent struck a projecting ledge of rock with so violent a concussion as to carry away a large extent of the face of the precipice. The whole mass fell into the basin below with a noise that startled the country for some miles around.

Rock basins are frequent in the bed of the river, which is worn in the rock, and rugged with water-worn rocky masses. The Falls of Gairsuppa may be justly ranked amongst the most magnificent cataracts of the globe. While excelled in height by the Cerosoli and Evanson cascades in the Alps, and the Falls of the Arve in Savoy, the Gairsuppa cataract surpasses them in volume of water precipitated; and while much inferior to Niagara in volume, it far excels these celebrated Falls of the New World in height.

There are other picturesque falls and cascades in this part of the Ghauts: those most worth seeing are the cascades of Honeycoom, about three koss from Allawully, and those of Yellapoor. Farther North are the splendid Falls of the Yenna in the Mahabuleshwar hills, 600 feet high; and to the South those of the Cauvery, 300—viz., the Gunga Chakki 300 feet high, and the Burra Chakki, or Southern Fall, about 200 feet. Then come the Cascades of the Neilgherris, viz. those of Pykari, Kaitee or Kulhattee, and the Elk cataract. The Falls of Courtallum in Tinnevelly are about 220 feet high, and the sacred cataract of Pupanassum among the Ghauts of Travancore 160 feet high, and lastly, of the Falls of Komari near Cape Comorin. The mass of water precipitated over these Falls in the monsoon, and the amount of erosion and minor details are still desiderata. Many other Cascades exist in the Western Ghauts, of which there are no published accounts at all. Those of Gokauk I have already attempted to describe.

<sup>\*</sup> The height of the Cerosoli Cascade is 2400 feet; that of Evanson, 1200 feet; and the Falls of the Arve, 1100 feet.

At Niagara a sheet of water, two miles across, is contracted to less than half its former breadth, and in the state of an impetuous rapid, running at the rate of seven or eight miles an hour, and about 25 feet in depth, is hurled over a projecting mass of horizontal limestone strata down a precipice 164 feet high, over which it falls in two great sheets into the basin below.

Western façade of the Ghauts. We now descended the Ghauts by the Hossulmakki Pass. Gneiss and its associated schists are seen as at Gairsuppa; but the gneiss is not so abundant.

These rocks are for the most part covered by a bed of red clay, sometimes fifteen feet thick; and on the summit of the Ghaut by laterite, in insulated beds and large dark coloured blocks. The laterite is almost wanting on the steepest descents, but is seen on the terraces which break the declivity, and again at a short distance from the base covering for the most part the lowlands of Canara to the sea at Honore.

Not far from the summit of the Ghauts two dykes of basaltic greenstone were crossed, running in a S. E. direction. The dip of the hypogene schists, which compose the great mass of the mountain chain, is irregular and confused, both on the descent and at the base.

The amount of dip varies from nearly vertical to horizontal, and the strata in many situations have suffered irregular flexures and contortions. One great mass of schists at the base dipped Westerly at an angle of 30°.

Base of the Western Ghauts. The gneiss and mica schists at the base of the Ghauts are veined with a pegmatite composed of white quartz, and flesh-coloured felspar, which is rather massive than schistose, and occasionally exhibits a tendency to assume the doubly oblique prismatic structure, or primary form of the latter mineral. Sometimes silvery white mica is seen segregated in this rock in very large rhombic prisms, capable of being divided, like the hemi-prismatic talc mica of Russia, called Muscovy-glass, into extremely thin lamellæ.

The mica schist passes distinctly into a chloritic clay slate, and into reddish and variegated slate clays resembling those around Darwar in the South Mahratta country. The white and purplish varieties have the same soft, and obscurely slaty structure. These egain, where exposed, rapidly assume the state of clay, under the heavy monsoon rains.

I observed several groupes of pinnacled columns, a foot or more in height, formed in these clays by the action of the heavy drops of rain falling from the high forest trees which shade them. On the top of each pinnacle was a small pebble, which explained the modus operandi.

These pebbles had been scattered over the surface of the clay, and had protected like a cap the portion of clay immediately under it from the downward washing action of these heavy drops, which had evidently worn away the intervening portions not similarly capped and protected. On removing the stone from the top of one of these columns, it was soon washed down by the heavy rain then falling.

Large veins of white, blackish and faint rose-coloured quartz associated with felspar, and imbedding large plates of silvery mica, are seen in the schists which in disintegration form a white earth with crimson dots and patches.

Town of Gairsuppa. A short distance Westerly from the base of the Ghauts, and about sixteen miles direct distance from the sea at Honore, stands the modern village or town of Gairsuppa, pleasantly situated on the left bank of the river to whose Falls it has given its name. It is shaded by a grove of tall cocoa-nut trees.

A little to the South of the present village lie the ruins of the ancient town which, under the rule of the Jaina Rajas of Ikery and Bednore, and the female dynasty of Baira-devi, is said to have contained a lac of habitations, and seventy-four Bastis or Jaina temples.

Although these traditions are not to be relied on implicitly, still there are marks of "Gairsuppa" having once been a place of considerable importance, as evident by the extent of the mounds and remains of walls enclosures, wells, &c. The remnants of five or six Jaina temples are still visible, in one of which stood the Chatur Muki, or four-faced idol of this sect.

It now comprises about fifty houses, inhabited principally by Sirigarras, a few Mahomedans, Conany Brahmins, and the low caste Halipaiks.

The Haiga Brahmins live chiefly on their own estates in houses scattered over the surface of the tract from which they derive their appellation of "Haiga," extending from Honore to Gokern.

From Gairsuppa to Honore. The face of the country from the town of Gairsuppa to Honore is diversified by hill and dale, well clothed with wood and thicket. The formation is chiefly laterite covering the hypogene schists, and forming long low ranges skirting the vallies, through which the Ghaut drainage finds its way to the sea, and flat-topped conical hills. Although the highest present freshes do not reach the base of the laterite coffs which flank their banks, it is



evident that they must have done so at some more ancient epoch during the elevation of the Ghauts from the bed of the ocean. They present alternately salient and re-entering angles, precisely similar to those seen in the banks of a large river.

Honore. The fort of Honore, or more correctly Honawar, stands on high, flat-topped cliffs of laterite, the base of which is washed by the embouchure of the Sarawati or Gairsuppa river, which here forms an extensive back-water or lagoon, owing to its mouth being obstructed by a bar of sand. The channel is said to have shifted within the last fourteen years.

The embouchure to the N. E. is protected by a small projecting island. The river during the rains is navigable for native craft as far as Chendawar.

The remains of Tippoo's lines are still to be seen on the laterite cliffs to the E. N. E. The public buildings, bungalows of the civilians and military, occupy the top of the cliff on which the old fort stood, and of which nothing but the foundations are now visible.

The native town lies at the base of the cliffs, and contains between five and six hundred houses, inhabited principally by Concany Brahmins, Haiga Brahmins, Mussulmans, native Christians, Halipaiks, Gouras, and a few Jains.

The staple produce is rice, cocoa-nut, and betel-nut. Salt fish is exported in considerable quantity, and the Gurugars here are celebrated for their skill in carving the sandal-wood of the Ghauts into work-boxes, card-cases, tlesks, &c.

Honore was early a place of considerable traffic. The Portuguese erected a fort here in 1505 A. D., and Hyder a dockyard, for the purpose of building a navy.

It is now a small civil and military station, subordinate to Mangalore, the head-quarters of the Collectorate of Canara. The temperature of the river freshes here in the month of August, was 78°. Temperature of sea 76°. Of wells from 84 to 87°. The last, which is that of a spring called Ram Thert, is possibly thermal? Temperature of air in the shade at the time 81°. Off the mouth of the river is a bold picturesque islet, said to abound in iron ore.

On the bank of the river near its mouth and close to the water's edge, I found some rounded fragments of a cream-coloured fossil lime-

stone, which at first from their situation and rolled appearance, I thought had been transported from the Ghauts by the river freshes; but which, on farther enquiry, I found had been discharged as ballast by boatmen from the N. of Bombay, probably from Cutch.

Some of these fossils are evidently a species of nummulite; others have a singular spiral structure, and spherical globular form, of which my friend Captain Allardyce has favoured me with the following magnified drawings. (See Fig., Diagrams 1 and 2.)

Of these singular fossils, I shall give Captain Allardyce's description, instead of my own.

## Description of Fig. 1.

This is a section of the fossil as it is most frequently seen: it shews little of the structure, except that it is convolute in this direction, which leads to the idea of its being a shell, and this a section across its axis or column.

## Description of Fig. 2.

This is a section of the same shell in the direction of its column: the outer portion is an even fracture towards the centre tending to divide the shell equally; but the interior portion must be supposed raised and hemispherical, part of the crust having been removed to shew the structure.

The striæ are minute grooves, being the longitudinal sections of a set of capillary tubes that run spirally round the column in number amounting to 50 or 100 all abreast.

The transverse section of these tubes is seen in the last whorl near the circumference, where they are cut across, and appear in the shape of pores or holes. During each revolution the tubes terminate six or eight times in a general partition, which runs from one end of the column to the other; so that these partitions resemble the divisions of an orange or the valves of a capsule. The tubes can be nothing else than spiral cells, while instead of one as in other shells, there is a great number combined, and it appears as if the animal had been divided into many parts like the corals. The thickness of the crust, as compared with the diameter of the cells, is extraordinary; and in this respect also there is a resemblance to the corals and encrinites.

The exterior shape of the fossil is subglobose.

There is another organic form contained in this limestone, of which the following figure No. 3, will give an idea, and which I think may be the true transverse section of No. 2. It exhibits concentric lines of holes or pores, slightly depressed at the extremities, and generally three in number. (See Fig., Diagram 3.)

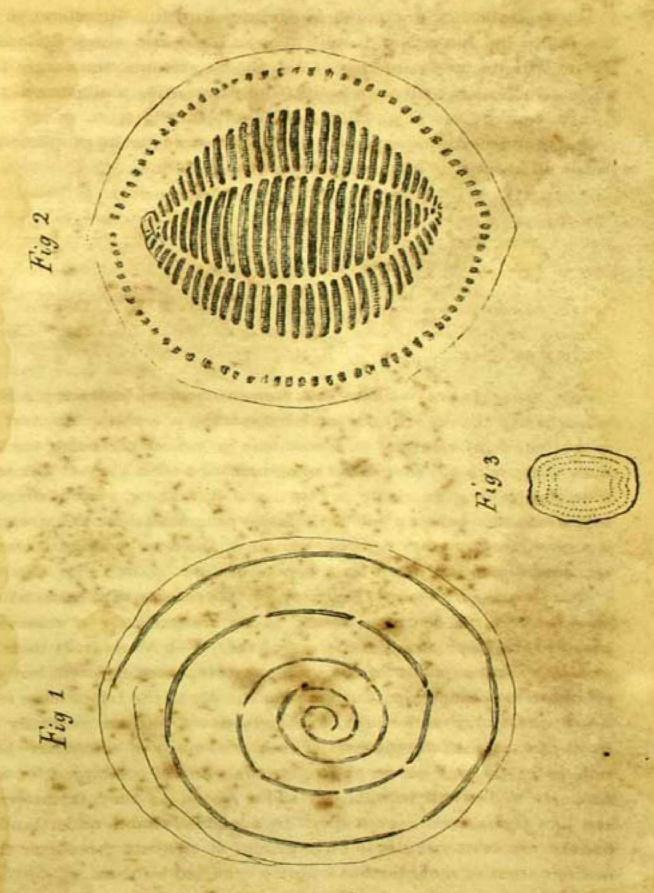
These fossils do not appear in the Cutch catalogue, or in other figured fossils of India that have fallen under my notice.

On the Meris and Abors of Assam. By Lieut. J. T. E. Dalton, Assistant Commissioner, Assam. In a letter to Major Jenkins. Communicated by the Government of India.

My DEAR Major,—I have this moment received yours of the 8th, for which many thanks. I fully intended sending you a supplemental paper, giving such information as I was able to collect regarding the Abors, their trade with the Meris, and communication with Thibet. The account I sent you was hurriedly written, and is, I know, very incomplete in many material points; but as a mere programme for the more ample narrative we may next year be, I hope, enabled to compile, it may not be necessary to add much to it at present.

The Customs, Language, Religion, &c. There is no very material difference between the Abors and Meris. They are evidently of common origin, and the Duphlas are of the same race. The Meris from their intercourse with the plains are, in some respects, more civilized, but almost all I have said concerning them applies equally to the tribes more remote. They intermarry with them, exchange slaves, and are generally in the habit of constant intercourse. The Meris, many of whom have become rich in cattle and goods, appreciate the value of combining for mutual support, and dwell in villages. The Abors, as they themselves say, are like tigers, two cannot dwell in one den; and I understand their houses are scattered singly or in groups of two and three over the immense extent of mountainous country occupied by them.

The Meris say, that whenever a few families of Abors have united into a society, fierce feuds about women and summary vengeance, or the



Fossil bodies (magnified) to illustrate Captain Newbold's paper.

dread of it, soon breaks up or scatters the community. They therefore prefer building apart, and depending upon their own resources for maintaining themselves in their isolated positions. They are compelled to be more industrious than the Meris, and can fashion themselves daos and weave coarse cloth, arts of which the Meris are ignorant, or more correctly speaking, which they have lost. The iron for the former is, I believe, obtained from the other side, for I have not learnt that they understand the art of working the ore, and that which the Meris import from the plains they purchase ready made into daos for their own use.

The cotton used in the coarse cloths they weave is grown by themselves, very little of it ever finds its way down here; but I saw one load of it this year, and it appeared of excellent quality. Between the Abors and Meris there is a considerable trade. The Meris import from the Abor country munjeet, beads, daos, "Deo guntas" the little bells I have described in my former account, and cooking utensils of metal, Myttons, slaves, and I may say wives, their marriages being so entirely a matter of barter. In return for which the Abors take cloths of Assamese manufacture, salt or any articles imported by the Meris from Assam. Of the mode in which their intercourse with Thibet is carried on, I have as yet obtained very little information. I have never yet met with an Abor who had been across, and the Meris I have questioned on the subject assert they had not seen the tribes who are in direct communication; but from those who had seen them they had heard of a fine rich country inhabited by people who wore fine clothes, dwelt in stone houses, and rode on horses, which was watered by a mighty river. How ever they manage it, the Abors import from this country every thing above enumerated, save the munjeet, slaves, and wives that they interchange with the Meris. The large metal dishes thus imported are of superior manufacture, and fetch high prices when brought in here by the Meris. The Meris possess cooking vessels of great size so obtained, which they use at their feasts, but are very jealous of producing before strangers. The daos are of superior temper, but of rude finish, and of the workmanship, as I believe, of Thibetan blacksmiths; they are probably made in the rough for the express purpose of barter with these people, as they are made in Luckimpore for the Meris. In addition to the articles I have enumerated, the Abors import salt (from the description given of it rock salt) from the north, for it appears they



have a very scanty supply of it, and gladly take our salt from the Meris when they can get it. I presume it to be an importation: what they export in return I know not, but most likely cotton and munjeet. Between the Duphla and Meris countries there is a tribe called " Auks" and "Auka Meris" by the Assamese, who never visit the plains, but yet appear, from all I have been able to glean regarding them, very superior to the tribes of this family we are acquainted with. Surrounded by lofty mountains, the country they inhabit is an extensive valley, represented as being perfectly level, and watered by a branch or perhaps the principal stream of the Soondree, and richly cultivated. They are said to possess fifteen large villages, the cultivation of one adjoining that of the other, so that there is no waste land between. Their chief cultivation and sole staple appears to be rice, to rear which they irrigate the land, and are said to have magnificent crops in return. Their lands are not, I am told, adapted to the cultivation of cotton, but they procure as much of it as they require from the Abors in exchange for rice. In industry and art they are acknowledged by the Meris to be very much their superiors, who however, perhaps for this very reason, look upon the Aukas as their The Auka ladies wear blue or black inferiors in the scale of creation. petticoats, and jackets of white cotton of their own manufacture: their faces are tatooed "unde nomen" Auka, which is given to them by the Assamese. They call themselves " Tenae." The males do not rejoice in much drapery; they wear a girdle of cane-work painted red, which hangs down behind in a long bushy tail I am told, and must have a comical effect. Of their religion all I have heard is, that every fourth year there is a kind of religious jubilee devoted to sacrificing and feasting at the different villages by turns; and on these occasions, some one officiates as priest: other particulars in which they differ from the Meris have been related to me. The Meris, however extensive the family and the number of married couples it includes, all occupy one house. The young men of the Tenae tribe when they marry leave their fathers' house, and set up for themselves. During the Moamorya troubles many of the Assamese of this division are said to have sought and found in the Tenae valley a refuge from the persecutions of that sect, the refugees appear to have been generously treated, and no obstacles were opposed to their return to their own country when the dangers that threatened them were removed; but I have sometimes heard that a few



remained of their own free-will, who settled in the valley, and are still to be found there.

The Tenae appear to be a very peaceably disposed people, but they occasionally are compelled to take up arms to punish marauding Abors, and they are said to do the business at once effectually and honorably, whilst the Meris and Abors confine their warfare to nocturnal and secret attacks, and, if successful in effecting a surprise, indiscriminately massacre men, women, and children. The Tenae declare hostilities, march openly to attack their enemy, and make war only on men, and their revenge does not extend beyond the simple attainment of their object in taking up arms. If this be true, it places them in a high rank, as a humane people, amongst our Mountain tribes. Tema is my authority for both assertions, humiliating as it should have been to him, and honorable to them; but he made the confession of the Meri mode of waging war without any remorse of conscience.

Assured that a more particular and better authenticated account of a people so sequestered and peculiar, would be interesting, I would, if permitted, next cold season make every effort to visit them, in the manner least calculated to excite jealousy or alarm. Their country is most easily accessible from the Duphla Door; but I am not yet well acquainted with this tribe, and am not prepared to say that it would be safe to attempt a passage through their country without a strong guard, which would defeat my object entirely; and having, I think, secured the good-will of the Meris, I would prefer their route, though said to possess more natural difficulties; ascending the Soobanshiri as before to Siploo Ghaut, I propose, after having paid Tema's country a second visit and explored such of the Sowrock country as lies on this side of the Soobanshiri, to proceed to the Turbotheah villages. The Turbotheah have promised to assist me in every way from Tema's village to their own, and as the Aukas or Tenae are only two good marches from the Turbotheah Meris, I should hope to be able to make amicable arrangements with them and the intervening Abors to permit me to proceed in safety to their valley.

I cannot hold out any very sanguine expectations of being able to penetrate so far as to behold Thibet from the mountain tops, or to gain much knowledge of that country; but without crossing the snowy range there is a vast extent of interesting country to explore, and if Mr.



Masters agrees to accompany me, we may pick up much worth knowing. I am sorry I was unable to send you a sketch of my late route. I wrote to Mr. Hornton, for a surveyor and the loan of a compass for myself, but unfortunately my letter did not find him at home, and I did not receive his answer till after my return. I had made my arrangements, and could not wait. I send you herewith a very rough ideal sketch, (published at p. 226) the ill execution of which I hope you will excuse, as I am very much hurried.

This time next year I hope to be able to propose an excursion to explore the Duphlas country. I had an interview yesterday with a considerable number of them, those for whom the salt has been sanctioned; and having concluded the business of the day, I had an amicable talk with them, and, on the question of a visit being started, they made no demur.

. Luckimpore, the 23rd March, 1845.

Notice of some Unpublished Coins of the Indo-Scythians. By Lieutenant Alexander Cunningham, Engineers.

In the accompanying plate are exhibited the small silver disc which was extracted from the Manikyala Tope by General Ventura, and several new coins of the Indo-Scythians, some of which are highly interesting from their undoubted Bauddha figures, emblems, and inscriptions. These coins afford the last links in the chain of evidence to prove the identity of the Indo-Scythian Kanerer, with the Buddhist prince Kanerer of Kashmir, as was conjectured by Mr. James Prinsep, so far back as 1833.

No. 1.—A thin piece of silver inscribed with an Ariano-Pali legend in two lines. In this short inscription, as in all the Tope inscriptions yet found, the letters are of a cursive and less decided form than those of the coins. Many of them are of course easily distinguishable; but there are others which bear no resemblance whatever to any of the letters found on the coins; and yet they can scarcely be new characters, as I believe that I have found the Ariano-Pali equivalent for every letter of the Sanskrit alphabet. Some of them may be new forms of known characters, and others are no doubt compound letters which may



possibly baffle us for a long time. The chief difficulty, however, lies in the loose and cursive manner of the writing, in which many letters of similar forms are represented by characters of the same shape.

In the present short inscription the only doubtful letters are in the lower line. The upper line reads simply Gomangasa, " of the anointed body (or limb)," from affer gom, to anoint, and sist angga, the body (or a member of it). In the lower line the first letter on the right is certainly k, (I write with two electro-type facsimiles of the original lying before me); the second looks more like n than any other letter; the . third is t; the fourth is tu or to, according to my alphabet; and the last is clearly s: thus forming kanatatusa, which is the Pali form of the Sanskrit kanyatratrasa, "the supporter or cherisher of maidens." The whole inscription is therefore Gomangasa kanatatusa, " (Stupa or Tope) of the anointed body of Kanyatratra."

The gold coins extracted from this Tope by General Ventura declare, in my opinion, most unquestionably, the age of the monument. They belong to OHPKI or Hoerki, whom I identify with Hushka, a Tartar sovereign of Kashmir just before the beginning of the Christian era. In General Court's inscription the Tartar prince Kanishka is mentioned with the title of Maharaja; and this title is also found in a second cylinder inscription. From these instances I infer, that when a tope was erected over a royal personage, his royal titles were inserted; and that in the absence of any title, we may judge that the tope was built over either a relic of Buddha, or the ashes of some eminent follower. Bhagawa himself particularly mentions the merits to be acquired from building thupa (topes) over relies of Sawaka or Chakkawati Rajas. In the present instance therefore I believe that the great Manikyala tope was built over a Sawaka (Sanskrit Srawaka) or lay votary of Buddha, named Kanyatratra; and that General Court's smaller tope was built over the relics of Kanishka himself.

I can find no authority for the erection of topes over the relics of the Buddhist priesthood, although we possess the names of no less than twenty-seven of the chief priests or patriarchs of the Buddhists, from the death of Sakya Sinha to A. D. 499. I find that in B. c. 62 to 28, the patriarch of Western India was named Kia-na-shi-pho, probably Kanyasibha, " the praiser of maidens." There is some similarity between this name and that of Kanyatratra, "the cherisher of maidens;" but in the



absence of all authority showing that stupas were erected over the priesthood, it is impossible to insist upon the identity of the two persons.

In support of the values which I have given to two of the letters in this inscription, I must refer to other inscriptions in which these letters are found. The first of them, which I have read as ng, in Gomangasa, occurs in Ventura's Manikyala cylinder inscription, in what is most likely the name of the father of Kanyatratra. That inscription I read as follows:

Swati-Siri-Munipasa-Gangaphuka-Munipa-putasa.

Swati Siri is the Sanskrit Swasti Sri, an auspicious invocation of very common occurrence in the beginning of inscriptions even at the present day. Muni is a holy personage, with the affix of pa, usually given to holy men; for instance Gwali, after whom Gwali awara (Gwalior) is named, is invariably called Gwalipa. Gangaphuka means "the bird of the Ganges;" and the whole legend is "All hail! (Tope) of the Muni, the son of Gangaphuka Muni." This of course refers to Kanyatratra Muni; and indeed the very name of Manikiyala points to the same conclusion; Muni-ka-alaya being "the place of the Muni."\* Another Muni is mentioned in Court's Manikyala inscription as well as the Maharaja Kanishka.

The same letter occurs again in the legends of the Kozola-Kadaphes, and Kozonlo-Kadphizes coins. The native legends of these coins are, with one or two slight variations, identical. That of Kozola-Kadaphes which has on the Greek side ZΑΘΟΥ ΚΟΖΟΛΑ ΚΛΔΑΦΕΣ ΧΟΡΑΝΟΥ, reads

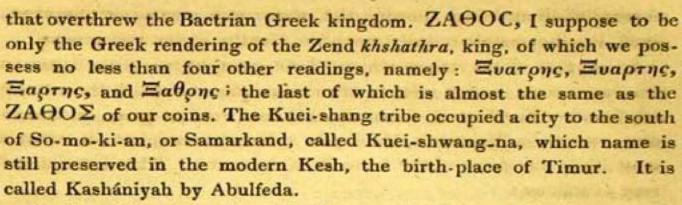
Khushangasa Yatugasa Kujula Kasasa, &c.

that of Kozonlo-Kadphizes, which has on the Greek side ΚΟΖΟΥΛΟ ΚΑΔΦΙΖΟΥ ΚΟΡ □ or ΚΟΡ □O, reads

Kushangasa Yatugasa Kujula Kasasa, &c.

which I interpret as " (Coin) of the king of the Kuei-shang, Kozola-Kadaphes." We know that the Kuei-shang were one of the five tribes of the Great Yu-chi, which tribe I identify with the Asiani, one of the people

<sup>\*</sup> Another derivation may be from Mani, a gem : Mani-ki-alaya, "the place or receptacle of the gem or relic."



Another tribe of the Great Yuchi were the Shwang-mi, who occupied the country called Shang-mi to the south of Wakhan and of the Great Mountains, which must be the modern Chitral and Mastuj.

A third tribe, the Hieu-mi, occupied the country on the Upper Oxus, or Wakhan. They gave their name to their capital, which was called Ho-mé; and from them, I believe, the river Oxus to have taken its name of Amú, because it rose in the country of the Hieu-mi. The Shakh river gave its name to Shakhnan, and the Waksh or Wakh river gave its name to Wakhan. Waksh, or Oksh وكش must have been the name from which the Greeks made Oxus.

The Hieu-mi tribe had at least one powerful monarch in the second Kadphises, who is called OOHMO on all his coins; a name which the French Savans MM. R. Rochette and Jacquet curiously divided, giving one-half to Kadphises, whom they called Mokadphises, and leaving the other half to stand upon its own responsibility.

The character which I have read as tu or to occurs in the legend of the coins of this Kadphises, which I read somewhat differently from Mr. Prinsep, he having been misled by giving an erroneous value to the letter g.\* which he read as ph. The whole legend, according to my alphabet, is, 'Maharajasa Rajadirajasa Sabatugahi-Surasa Mahi-Surasa Hima Ka-

\* It is now nearly four years since I corrected this error from the legends of the coins of Gondophares, and his nephew Abdagases. On the coins of the latter the Greek legend is BAZIA YAZIA YNAIDEPIII AAEADIAEIIIZ, and the native legend is "Maharajasa tadarasa Abdagasasa Gondophara bhata-putasa," "(Coin) of the great King, the preserver, Abdagases, Gondophara's-brother's-son." Here we have bhata-puta, the literal translation of the Greek AAEADIAEIIZ. The Kashmiris still say Bhai-putr. The letter g occurs also in the native transcript of the Greek Zτρατηγος which is rendered in Pali Thategasa. The whole legend is "Aspavatisa Thategasa jayatasa Indavatiputasa," "(Coin) of the General Aspabates, the victorious, the son of Indrabates." Aspabates was the General of Azas. His coins are found in the Western Panjab.



phisasa Tatasa,' "(Coin) of the great King, the "King of kings, the every-where-destroying-hero, the hero-of-the-world, (of the tribe of) Hieu-mi, Kadphises, the preserver." On one well preserved coin the letter hi is omitted in the middle of the inscription, which, if intentional, simplifies the third title to 'Sabatoga-Surasa,' "the all-pervading hero." Sabatu is the regular Pali-form of the Sanscrit Sarvvatra, everywhere, in all places.

The coins which I am now about to describe, with the single exception of No. 4, have all been in my own possession. My gold coins have passed into the hands of Sir Herbert Maddock; but I still retain perfect impressions of them both in lead and sealing-wax. Figs. 2, 3 and 4 are unique; fig. 5 is not uncommon; but finely preserved specimens, such as the one now published, are extremely rare. Fig. 6 is unique. Of Fig. 7, I have seen only three specimens; one of smaller size in Mr. James Prinsep's cabinet; a specimen in my own possession from the Kabul valley; and the coin now published, which was amongst those extracted by General Ventura from the Manikyala Tope, and is now in my cabinet. Fig. 8, is common; but good specimens are very rare. Figs. 9, 10 and 11 are all rare: the last is the rarest, and the first the least rare.

No. 2.—A round gold coin, weighing 122 grains, of very good make, and in excellent order.

Obverse. Half length figure of the king inclined to the left; the head encircled by a halo, and dressed in a highly ornamented tiara: flames issue from his shoulders; his left hand grasps a sceptre, and in his upraised right hand he holds before him a cylindrical object by a handle below. His dress consists of an under robe fastened down the middle, and an upper garment open in front, with loose sleeves, and adorned with necklaces and armlets. Inscription around the piece in barbarous Greek characters PAO NANO PAO O  $(\eta\rho\kappa\iota)$  KOPANO, "The King of kings, Hoerki, Koran."

Reverse. A full length winged female figure, dressed in an upper garment with short sleeves, and in a long under robe reaching to her feet: she carries a trident, or perhaps an elongated cornucopia in her left hand, and in her right she holds out a chaplet. In the field to the right is the usual monograph of the Indo-Scythian coins; and to the left in bad Greek characters the legend CAMI (or OANI) MAO; the whole ornamented by a dotted circle.



The figure on the reverse of this piece is very like that of Victory on the coins of Menander, Azas, and Undopherras; and it has also a striking resemblance to the Ardokro, depicted in No. 10 of the accompanying plate. But the legend appears to be Vami Mao, which, if intended for the Sanscrit TITI, Vama, a woman, may be translated as "the female Moon," or Chandri, the consort of Surya or the Sun. For the Moon is an Androgyal deity; being male or the god Chandra, when in opposition to the Sun, and becoming female or the goddess Chandri, when in conjunction with the Sun. If the legend should be Vani Mao, the interpretation will then perhaps denote some identification of the Moon with the goddess Saraswati, who as TIMI, Vani, was the goddess of Science and Learning, and who, as the consort of the Sun, became the mother of the river Jumna.

No. 3.—A round gold coin, weighing 125 grains, of good make, and in fair order.

Obverse. Essentially the same as that of the coin just described, excepting that the left hand of the king is apparently empty, and that the ends of a diadem are seen floating behind his head. Legend in bad Greek characters, almost illegible from faulty striking, but probably the same as the last.

Reverse. A full length male figure to the left, clothed in a long sleeved dress, with a loose robe flowing behind; the head surrounded by a radiated halo; the right arm extended to the right, and the left hand resting on the hip. In the field to the left the common Indo-Scythian monograph; and to the right in bad Greek letters the legend OM  $BO\Delta$ , or perhaps  $O\Delta I$   $BO\Delta$ ; either Aum Buddha, or Adi Buddha; the  $BO\Delta$  being most probably a contraction of  $BO\Delta YA\Sigma$ , which was one of the several Greek renderings of the name of Buddha.

On both of these coins, the instrument, which the prince holds in his right hand, resembles exactly the praying cylinder which is used by all Lamas of the present day. It is called Muni by the Bhotias, and Skoru by the Tibetans. I have one now lying before me, which I procured from a Lama near Triloknath on the Chandrabhaga river. It is a thin cylinder of brass, three inches long, and two inches and a half in diameter, filled with a long paper roll of writing, which, I was told, contained only prayers. By a gentle motion of the hand it is kept continually re-



volving upon its axis, which, being prolonged below, forms the handle of the instrument. The motion is assisted and regulated by a small octagonal piece of iron fastened by a short chain to the side of the cylinder.

Moorcroft saw one of these mechanical prayer-mills, of a large size, turned by water, which probably performed the prayers of a whole village, while the inhabitants were at work in their fields. Every Lama carries a Skoru or Muni; and if these Indo-Scythian kings had spiritual as well as temporal authority, as the flames issuing from their shoulders would seem to show, (Mahawanso, p. 27,) no instrument could be more appropriately put in their hands than the praying cylinder.

A common expression in Buddhist writings is "turning the wheel of the law;" and in the 7th volume of the Asiatic Society's Journal, p. 147, M. Csoma states, on Buddhistical authority, that the 8th general principle for the conduct of a zealous Buddhist is "to exhort all Buddhas to turn the 'wheel of religion.'" Now I would suggest that this "wheel of the law," or "wheel of religion," (dharmma-chakra) may be only the praying cylinder; and that to turn the wheel of the law meant literally to turn the prayer cylinder; and figuratively to make religion advance. This interpretation, which would prove, beyond all doubt, that these princes were of the Buddhist religion, is I think fully borne out by the Buddhistical version which I have given to the reverse legend of No. 3, and by the Buddhistical figures and legends on the reverses of Nos. 6 and 7.

No. 4.—A round gold coin, of beautiful make, and in excellent preservation. This piece belonged to the collection of my much lamented friend, the late Dr. Lord; and it is now, I believe, in the museum of the East India House.

Obverse. A full length male figure to the left, apparently dressed in a complete suit of chain armor; the head encircled by a halo, and covered by a helmet, having long flaps which protect the ears;— the left hand raised and holding a trident, and the right hand pointing downwards to an undecided object, which may probably be only a cylinder similar to those found in the Topes; or it may be a small Stupa itself, as it is surmounted by a trident. In either case it would be an object held sacred as containing a relic of Buddha. Legend in bad Greek characters around the piece PAO NANO PAO BAAANO KO-PANO, "The King of kings, Balanus (or Bala,) Koran.



Reverse. A three-headed full length figure to the right, standing before a bull, which has a bell hanging from its neck; the figure clad in the Indian dhoti, and wearing the sacred string of the superior castes; and holding out in his three hands, three different objects, one of which looks like a noose. The Indo-Scythian monograph over the bull's head; and to the left in bad Greek letters the word OKPO, which Professor Lassen has happily explained by Ugra, one of the many names of Siva: the whole surrounded by a dotted circle.

This figure is, I believe, the personification of Siva, under his triple form; the same in which he is sculptured in the caves of Elephanta and Ellora; one head representing the destroying power, and the other heads the two creative powers, male and female, or Siva and Parvati, behind whom stands the sacred bull Nandi. On the coin before us there are but three arms; although the triple headed busts of Siva have six arms: the other three arms have been omitted merely from want of space.

On this coin we have an entirely new name added to our Indo-Scythian list. In the annexed sketch it is but faintly traceable, as the lithographer has failed in faithfully representing my sketch: but I may mention that the first two letters are distinctly BA; the third is A or A, and the last three are ANO or perhaps AMO: thus forming either BAAANO or BAAANO. That the former is the true reading is, I think, almost confirmed by the following fact. The author of the Raja Tarangini in mentioning the cause of quarrel between the Raja Hiranya, and his younger brother Toramana, the Yuva Raja, states that Toramana, having melted down the ancient coin of the country called Balahats, framed Dinars in his own name. Now Bala-hat means simply " the mintage of Bala," who must therefore have been a former ruler of Kashmir; and was most probably this very Balan, whose name we have just discovered for the first time upon a coin. For I contend that Balan or Balano or Balanus, who is clearly from the make of his coin of the same family as Kanerki, was equally with him a king of Kashmir, and perhaps prior even to Kanerki; as this single coin is decidedly superior in execution to that of many of the Kanerki coins which I have seen. But Mr. Prinsep's engravings of the Kanerki gold coins exhibit several pieces of apparently the same beauty of workmanship; and therefore I shall be content for the present with ranging Balan in the series of Indo-Scythian princes immediately following Kanerki.



No. 5.—A round copper coin, of large size, of beautiful make, and in more perfect preservation than any other Indo-Scythian copper coin that I have seen.

Obverse. Full length figure of the king to the left, bearded; his head covered with a curious cap having a brim or peak to the front; and the ends of a diadem floating behind. He is dressed in a long coat, under which his trousers appear, and over which a loose robe falls behind in circular folds. His left hand grasps a spear or trident, and his right hand is pointed downwards over the same object which is seen on the obverse of No. 4. Legend in corrupted Greek characters: PAO KANHPKI, "king Kaneri."

Reverse. A radiated and bearded figure, running quickly to the left; dressed only in a pair of very short tight drawers, and holding up with both hands a large loose robe or cloak, which falls in circular folds behind him. To the left is the Indo-Scythian monograph; and to the right in bad Greek characters the word  $OA\Delta O$ ; which Professor Lassen was the first to explain very happily by Vado; Sanskrit Vata, Zend Vato, and modern Persian Bad, or "the wind;" which is represented running more or less quickly on different coins. The coins of this type in copper are of three sizes; large, middle, and small.

No. 6.—A round copper coin, of large size, and uncommon thickness; of very good make, and in tolerable preservation.

Obverse. Exactly the same as the preceding.

Reverse. A figure scated in the Oriental fashion; the hair dressed in a knot on the top of the head, which is encircled by a halo formed of dots; the ears either elongated after the manner of Buddhist sculptures, or adorned with jewels; the left hand resting upon the feet, and the right hand, with fingers extended, placed opposite the breast, in a manner peculiar to Buddhist figures, and more particularly to Amogha Siddha, one of the five celestial Buddhas. Amogha Siddha is also a title of Adi Buddha himself. Monograph to the left: and legend around the piece in corrupted Greek characters, O BOAA CAM; which I think may be intended for OM BOAA CAMANA or Aum Buddha Sramana. I do not by any means insist upon the correctness of this reading; but it is a highly probable one, from its being placed around an eminently characteristic Bauddha figure.



No. 7.—A round copper coin, of large size, thickly coated with indurated verdigris. This piece is one of those extracted by General Ventura from the Manikyala Tope, and which I obtained in exchange from Mr. Prinsep.

Obverse. Similar to Nos. 5 and 6.

Reverse. A full length figure standing to the front, and clad in a long dress: the head surrounded by a circular halo; and the hands raised together before the breast in an attitude, which is peculiar to the figures of Samant Bhadra, the first of the celestial Bodhisatwas. Samant Bhadra is also one of the names of Adi Buddha, (see Hodgson's Trans. R. A. Soc. 2, p. 239.) The monograph to the left: and legend in corrupted Greek characters, ~ O AAO BOA CAMA .. .. .. A similar copper coin, of middle size, is figured in the Asiatic Society's Journal, (vol. 3, pl. 25, fig. 11,) on which the legend, as given by Mr. Prinsep, is OAYO BOY CAKANA. By a comparison of the two legends, I am inclined to read them either as Aum Adi Buddha Sramana, or simply as Adi Buddha Sramana. The first letter, which Prinsep read as O, has on this coin a turn to the left, which identifies it with the peculiar flourish, which is found at the commencement of many ancient inscriptions, and which is generally allowed to stand for the sacred unutterable syllable Aum. Of the letters to the left, the first four only are preserved upon the present coin: but they agree generally with those on Mr. Prinsep's engraved specimen. The first letter on both is C, and not A, as Professor Lassen has made it with some hesitation, and the last two letters on Mr. Prinsep's coin are NA: consequently we have altogether CAMANA for Sramana, 'an ascetic,' which is a common appellation of Buddha, and was well known to the Greeks as ZAP-MANO $\Sigma$  or  $\Sigma \in MNO\Sigma$ .

\*No. 8.—A round copper coin, of large size, of good make, and in good order.

Obverse. A male figure mounted on an elephant, moving to the right.

Legend in corrupt Greek characters around the piece, PAO (vavo) PAO

KENOPANO " the King of kings, Kenorano."

Reverse. A full length male figure, dressed in flowing garments; with the right hand raised, and the left hand resting on the hip. Behind his shoulders a large lunar crescent. Legend to the right, MAO 'the Moon'; and to the left the usual Indo-Scythian monograph,

No. 9.—A round copper coin, of middle size, of good make, and in good order.

Obverse. The same as No. 8.

Reverse. A full length female figure to the right, clad in a long robe, with a short tunic reaching to the waist; the left hand supporting a cornucopia, and the right resting on the hip; the head covered, and surrounded by a halo. Corrupt Greek legend to the left,  $AP\Delta OXPO$ ; to the right, the usual Indo-Scythian monograph.

No. 10.—Essentially the same as the preceding; but the figure is looking to the left, and holding out a wreath in the out-stretched right hand.

No. 11.—Precisely the same as No. 9: but the figure faces to the left. The title of KOPANO on these Indo-Scythian coins, which follows the names of KADAPHES, ORRKI and KANERKI, has not yet been satisfactorily explained. It certainly cannot mean king, as we have Zatlos on the coins of Kadaphes, and Rao-Nano-Rao on the coins of his successors. In a paper on the coinage of Kashmir published in the Numismatic Chronicle of London in 1843, I suggested that it was derived from the Greek KOPΩNIΣ, with curling horns; and that the Arabic Zul-karnain pointed to that derivation. In this sense Koran would mean Alexander the Great; and the Princes who take that title would claim descent XOPAN CV and KOPCO might then stand for from Zul-karnain. ΚΟΡΑΝου Σγγγενους, " the kinsman of Koran;" and this interpretation offers a plausible reading for the Greek legend of the earlier coins of Kozonlo Kadphizes, on which we find ΒΑΣΙΛΕΩΣ ΣΤΗΡΟΣ ΣΥ ΕΡΜΑΙΟΥ, which I interpret as " (Coin) of the king, the preserver (Kadphizes) the kinsman of Hermæus." I have since found that the Mogul author Sanangsetzen declares, that the Tartar prince Kanikia bore the title of Prince of Mercy. It is probable therefore that Kanishka's title of Korano is derived from the Sanscrit karuna, mercy. however still leaves unexplained the letters following Koran on the coins of Kadaphes and Kadphizes. On the former the title is XOPAN CV (and not XOPANOY as usually given). On the latter, it is KOPCO.

The happy conjecture made by Mr. James Prinsep in 1833, that the Kanerki of the coins was the great Buddhist Prince Kanishka of Kashmir, has been amply confirmed by the Bauddha figures, emblems, and legends on the coins which I have just described. The Honorable



Mr. Turnour also identified them in 1836. In 1838, Professor Lassen did not object to the identification of the names of Kanerki and Kanishka; nor even to that of Oerki (or Huirki) and Hushka; but he added besides the difficulties in chronology another reason from the coins themselves is opposed to our recognizing Hushka and Kanishka in Oerki and Kanerki. Both of them are described as Buddhists; upon the coins of the latter however a worship, entirely deviating from that of the Buddhists, is distinctly obvious."

The difficulties in chronology have, I think, been satisfactorily accommodated in my paper on the coinage of Kashmir already mentioned, in which I showed that the Tartar prince Kanishka, according to both Brahmanical and Buddhistical authorities, flourished at the beginning of the Christian era; agreeing with the age of the smaller Manikyala Tope opened by General Court. In that Tope there was found a long inscription of Maharaja Kanishka, accompanied with four gold coins of Kanerki, and seven Roman silver coins ranging in date from B. c. 73 to 33. The copper coins belonged to Kanerki himself, and to his immediate predecessors Kadaphes of the Kuei-shang tribe, and Kadphises of the Hieu-mi tribe. The Tope must have been erected posterior to B. c. 33, and most probably after the death of Kanishka in about A. D. 25.

The other difficulty has been successfully removed by the discovery of the coins now published, which bear eminently characteristic Bauddha figures, emblems, and inscriptions. On the golden bust coins we see the Prince himself represented with a halo round his head; with flames issuing from his shoulders, as sculptured on the figure of Buddha discovered by Dr. Gerard, (J. A. S. Bengal, vol. 3, pl. 26, fig. 1,) and with the prayer-cylinder (or dharmma-chakra) in his right hand; the identical instrument which is in the hand of every Lama of the present day.

The knowledge of this fact, of the identity of the religion of these two princes, we owe chiefly to the science of Numismatology; and the numismatist may proudly point to it as one of the many useful rays which the beacon of his favorite study has thrown over the treacherous quicksands of history. So true are the words of the poet,

The medal, faithful to its charge of fame, Through climes and ages bears each Prince's name. On Kunker formations, with Specimens. By Captain J. Abbott, B.A. I have the pleasure to send you a few specimens of Kunker, collected by me in my late journey down the Ganges. I had purposed bringing away a small section of a Kunker formation, showing the substance in which it is imbedded and the strata immediately above and beneath; but I was travelling in too great haste for this. The accompanying specimens, however, exhibit nearly every species of Kunker the matrix of one, and its calx after the extraction of the lime by fire.

I have been so separated from scientific literature for many years past, that I know not what may be the existing theories of the formation of this mineral; and in offering the following am prepared to find myself forestalled if, indeed, the theory is well founded.

The word Kunker, in its general application, like our own term gravel, is applied by the natives to any small or rounded masses of stone, whatever their substance, but it includes especially every variety of the limestone under consideration. This is found in several forms in the wide plains of Upper and Central India. Not I think in Afghanistan nor Persia, nor any where beyond the influence of the periodical rains. It occurs only in mixed strata of sand and clay, which on analysis prove to be impregnated with lime, and its presence is generally denoted by the sterility of the soil above it.

Its position from the surface of the soil varies from ten to fifty feet or more. But although, through the erosion of the upper stratum (as for instance in the neighbourhood of large rivers) it may sometimes be found at the surface, it is never there formed or deposited originally.

Its forms are,-

1st. Small rounded drops, from the size of a pea to that of a bullet, in a matrix of clay and sand often of great depth, but seldom separated into distinct homogeneous strata.

and mixed. In such cases the clay and sand strata are generally distinct.

3rdly. In what is improperly termed stratified Kunker, but which I take the liberty to name confluent Kunker, (almost all Kunker occurring in strata.) In this form it presents extensive fields, from one to five feet in thickness, generally very rugged and porous, but occasionally separable into compact masses of a hundred solid feet or more.

On considering the shapes of the granulated masses, they will be found to resemble the figures assumed by molten lead when plunged into water. The substance appears to be generally clay and carbonate of lime: the latter falling away freely under the action of the furnace, and leaving the clay in the form of a hardened mass more or less vitrified.

The formation of Kunker appears to me to be affected by the infiltration of rain water impregnated with lime through a bed of clay; to be in fact Tufa deposited in clay, or a sponge of clay saturated with the carbonate of lime.

When the heavy rains of the monsoon fall upon a soil of alternate sand and clay strata impregnated with lime, the water easily soaks through the loose texture of the gneiss sand, taking up with it a certain proportion of the lime in its passage. But on meeting the closer substance of the clay stratum it there stagnates for a while, and each of these clay strata becomes as it were the bottom of a subterranean lake, the absorption here being very gradual and difficult, and the water parting with its lime to the clay, ere it can be effected.

When the lime is contained by the soil in large quantity, and the clay stratum is dense or the duration of the deposit very long, confluent Kunker will be formed; chiefly in the sandy stratum, but upon that of the clay: and should (if this surmise be just,) contain a larger proportion of sand than the granulated varieties.

When lime prevails in mixed soils of clay and sand, not distinctly stratified, the Kunker is found in very small grains dispersed confusedly through the mass. These seem to be formed by isolated drops of water impregnated with lime, which gradually filtering have deposited each a nucleus of lime, that yearly enlarges by fresh incrustations; but very gradually, owing to there being no general arrest of the impregnated water. This minute Kunker forms the sand (so to speak,) of many of the streams of Central India.

Kunker yields almost the only lime used in Upper India by builders. The quality yielded by various strata is very various: often it is excellent, but never perhaps equal to that of the more solid limestones, or of the superficial Tufa deposited by streams.

It may appear improbable to some, that rain water should so readily absorb lime, or so easily part with it; but it is perfectly consistent with observed phenomena. In Malwa where the substratum for 1500 feet is

trap, and no limestones are known, the springs are so impregnated with lime, taken up in their passage through the clay stratum, as to frost the glass of the windows splashed in moistening tatties. This frost work is as complete as that produced by fluoric acid. The smaller streams exhibit the same impregnation; and wherever they fall over a precipice, huge masses of Tufa are deposited by them on the yearly growth of lichens upon the brink.

I have seen many such masses of several hundred tons weight, and one of these, torn from the precipice apparently by its own gravity, was quarried for many years for the supply of the finer lime used at Mhow in Malwa, and is yet I believe unexhausted.

The obstructions of the human viscera so common in Malwa and Nimaur, I attribute to the action of the lime thus held in solution by the water. Tufa water is a well known poison in Italy. It saps the digestion, and causes gradual decay without any perceptible violence. The Italians observing this, fancy that it petrifies the vitals.

But one of the most remarkable examples of the action of water upon lime is observable in the mausoleum of Hoshungh Shah Ghorie, in Maandoo, Malwa. This building is faced within and without with a coarse granulated limestone from the Nerbudda, passing current in those parts for marble. From long neglect, Peepul and Dhamun trees have penetrated with their finer roots the substance of the dome, so that water filters through copiously during the monsoon, and, being preserved in small cavities, continues to drop down, long afterwards. This water in its passage through the mortar of the roof, takes up a certain quantity of lime, which it again deposits in the interior lining of the dome in long stelactitic pendants.

This fact was observed in the days of Ferishta the historian, for he says regarding it, (I quote from memory)-" People who are rather devout than learned, think that the very marble weeps above the tomb of Hoshungh Shah. But we, who are above such puerilities, easily comprehend, how wind penetrating into the substance of the stone becomes there condensed into water."

## 4, Harrington Street, 13th March, 1845.

J. Аввотт.

Nors.-The large masses are from confluent strata, below Allahabad. These strata from three to five feet thick are encrusted above with such large loose masses as these. One, however, is part of a slab of confluent Kunker, broken by me. - J. A.



An account of the Early Abdalees. By Major R. Leech, C.B., Late Political Agent, Candahar.

## PREVACE.

In Nyamatulla's History of the Afghans, by Dorn, Avdal the son of Tareen, the son of Sharkhbun, the son of Sarbanni, the son of Pathan, is said to have had two brothers, Toor and Aspin; and three sons, Barik, Popal and Ali. Dorn in a note (38) on the authority of the Khulassat Ulansat, however, gives Abdal two sons, Firak\* and Isa. Firak had three sons, Popal, Barek and Alekko;† and Isa had five sons, Alizye,‡ Turzye, (Noorzye of Elphinstone,) Ishakzye, Makoo and Khogani, which latter are called collectively Panjpai.§

Again Malcolm, in his History of Persia, on the authority of a native historian of no note, apparently a Barikzye writing for Persian readers, attributes the rise of Sado, the progenitor of the royal house of the Sadozyes, to the favor of a king of Persia, Shah Abbas the Great, (entitled by the Persians the Beatified) obtained on a visit to the Persian court to complain of the tyranny and extortions exercised and committed by a Persian Governor of Western Afghanistan. When about to return to his native land, the king conferred on him the title and privileges of a "Speen Jeerak" (white beard,) over the Afghans, including the power of life and death over them all, with the exception of the Barikzyes, and declared his person and the persons of his descendants sacred.\*\*

It is even related by the Persians how Sado served for some time in the disguise of a groom in the royal stables; and having been promoted to the charge of one of the king's favorite horses, how he attracted the

<sup>\*</sup> Known to the Afghans as Zeerak, as are the descendants of his three sons.

<sup>+</sup> His tomb is said to be at Neecharah in Beelochistan.

<sup>†&#</sup>x27;Alizye is not the name of the son, which is Ali, but of his descendants; Zye being the Persian corruption of Zo'e, which in Pushtoo means a son.

<sup>§</sup> Panjpai, though literally meaning five feet or five supports, is often applied to more than five subdivisions of a tribe.

<sup>||</sup> Sado is still a common name among the Afghans.

<sup>¶</sup> Januat Makan.

<sup>\*\*</sup> Which they continued to be until the murder of Shah Shuja-ul-Mulk at Cabool, in April 1842.

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notice of Majesty by the striking effects of his assiduity in grooming.

Finally, in the History of India, Shah, an Abdalee Governor of Herat, is mentioned; and as these three items compose all the information which to my knowledge is possessed at the present day of the Early Abdalees, the following few pages have been compiled to supply much that is deficient, chiefly from a manuscript procured in Afghanistan, a second copy of which I never met with, and partly from accounts written at my request, and from enquiries made from time to time during a continued residence of five years in Afghanistan.

As the information now furnished was not possessed by the late Shah Shuja, I am in hopes it may not elsewhere be considered stale.

The following few prefatory "Remarks on the Origin of the Afgham," will not perhaps be thought misplaced, coming next and before treating of the Abdalees.

Much has been written on the descent of the Afghans. They believe themselves to be descended from king Saul. There are some circumstances against, and some in favour, of this belief.

Those against, are-

1st. They have among their predecessors no Jewish names except that of Kais, the Kish of Scripture (1 Samuel, chap. ix. verse 1,) who was according to some the first Afghan who believed in Mahommed, and in consequence received the title of Abdu Rasheed; the Jewish names now common among them being gleaned from the Kuran.

2nd. They have no vestige of the festival of Purim instituted by Esther, (chap. ix. verse 28.)

Those in favour, are-

1st. Contrary to the precepts of the Kuran, they do not permit a widow to marry any but the heirs of her husband, and the Jews did not allow a virgin to marry out of the tribe, (Numbers, chap. xxxvi. verse 8,) or a widow any but first her brother-in-law, (Deuteronomy, chap. xxv. verse 5). The heir however among the Afghans, in case of his not proposing for the widow, is not reduced to the alternative described in the 9th verse of the same chapter.

2nd. They do not allow daughters a portion of inheritance with the sons. Likewise did not the Jews at one time, if we judge by inference from Numbers, chap. xxvii. verse 8.



They have a custom alike repugnant to the Jewish as well as to the Mahommedan creed, common in Wales, where it is called "bundling." The Afghans call it "Namzad-bazee," or "betrothal game."

Khaja Nyamatulla, in his History of the Afghans, says that David swore to Saul, (1 Samuel, chap. xxiv. verses 21 and 22) that on Saul's death two of his wives were with child, one bare Berkia, and the other Irmia. The son of Irmia was Afkana, and the son of Berkia, Asif.

Sir W. Jones says, Saul had two sons, one called Berkia and the other frmia, who served David faithfully, and were beloved by him. The son of Berkia was called Afghan, and the son of Irmia, Usbee.

Neither of these accounts agrees with the Scripture. The name of "Elkanah" is the only one occurring in the Books of Samuel, Kings, or Chronicles, in the least resembling Afghanah or Afkanah; and although it cannot by any Persian rule be corrupted from Elkanah, yet we find the name Hul, (Genesis, chap. x. verse 32,) corrupted into the Persian Hood.

Asaph (Asif,) the son of Berechiah (Berkia,) is mentioned; 1 Chronicles, chap. iv. verse 17; and Berechiah and Elkanah in the 23rd verse of the same chapter.

Berachah, Irmia (Jeremiah,) and Elkanah as connected with Saul, are mentioned, 1 Chronicles, chap. xii. verses 3, 4 and 8.

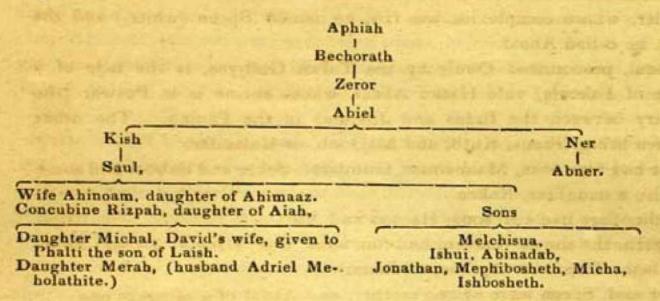
If we look upon Kais as a progenitor of the Afghans, and suppose that they increased in the same manner that the children of Israel did, (viz. at the rate of 2,100 for every year,) and also allow Kais to have lived in the time of Mahommed, then at the time that Elphinstone wrote, the Afghans should have amounted to 2,500,000. Elphinstone estimates them at 4,300,000. This would by the same calculation refer the progenitor of the Afghans back to about the time of Alexander.

If again Afghan, a grandson of Saul, was their progenitor in Elphinstone's time, by the same calculation they should have amounted to about 5,700,000, including the Afghans of Hindustan.

Sheer-bha or "price of milk," is sometimes given to the mother of the daughter if a widow.

<sup>\*</sup> This is allowed after the "Ijab kabool," formerly asking in marriage and accepting before witnesses, but before the nika or marriage ceremony, being the blessing of the Mulla. A settlement also being first fixed before the Mulla of the parish.

Among the descendants of Saul mentioned in the Scripture, as will be seen from the following, no name occurs approaching Elkanah or Afghanah.



Elopement also takes place among the Afghans, and the clan in which the couple take refuge consider it a point of honor not to give them up to the tribe of the father. Arbitrators adjudge seven girls to be given in exchange, one actually mounted on horseback, and two others are valued at 100 Candahar rupees each; half is paid in ready money, and half in goods, a matchlock, a sword and a gonee or bag of grain, being each calculated at a Tuman of twenty rupees.

They (many tribes) divide their lands according to "Orbale" or fire-sides, and bachelors get nothing but their own zarkhureed or purchased lands. The tribe of Shimalzai Ghiljyes say, that their tribe was once so numerous, that by each man subscribing a bush of brushwood (used for fire-wood,) a couple was set up in the tribe. This subscription is called " Baspand."

On the 3rd November 1841, a widow, the daughter of Ashraf a Baeezye Hotak, complained to me as political agent at Kalat-i-Ghiljye, that her daughter had been engaged to one Ghafoor Bahlol-khel Julalgai Tokhee, a khoon-kash or bleeder by profession, for the last fourteen years; for the last eleven of which he had not been heard of, and was therefore to be considered dead. She therefore wanted his heir (a brother) to dissolve the contract, take her himself off her hands to what was now become her tribe, or support her while for a further period she waited for her intended.



Tareen, the son of Sharkhboon (alias Sharafudeen,) the son of Surbannee, the son of Kais (Kish Abdu Rasheed, and Pathan) is said to have had three sons; one, whose complexion was dark, he called Tor (black,) another, whose complexion was fair, he named 'Speen (white,) and the third, he called Abdal.

Abdal, pronounced Oudle by the Toran Ghiljyes, is the title of a grade of Fakeers, vide Hasan Abdal, whose shrine is in Putwar (the country between the Indus and Jhelum) in the Panjab. The other decrees being Ghous, Kutb, and Majzoob, or Kalandar.

Tor had four sons, Malmoonee, Gundaree, Sekee and Baboo, and some say also a daughter, Kakee.

Malmoonee had two sons, Haroon and Alee.

'Speen, the son of Tareen, had four sons, Dur, (Duver, Dabar) Suleman-lagh, Tam and Opchee, (Adhami).

Tor and 'Speen were of one mother, and Abdal of a separate one.

When Tareen was well advanced in years, Tor and 'Speen had grown up, but Abdal was still a boy. One of Tareen's wives one day observed to him, that he had got old, and it was better that during his lifetime he should nominate as his successor in the chiefship his most promising son, and himself seek retirement, and pass his time in the service of God.

Of this, Tareen approved. Tor and 'Speen each hoped the lot would fall on him, and their mother's wishes were for Tor, her first-born. 'Speen was annoyed at this prospect, expressed his annoyance, and advanced his own claims. The mother of Abdal with great humility and modesty brought forward her son's claims, which were, that notwithstanding his youth he possessed more noble qualities than either of his brothers. Tor and 'Speen were both annoyed at this, and said, "Our young brother is no more fit to rule than our old father." One day a holy Sayad who had given up the world arrived, and Tareen referred the choice to him, saying himself that he had a foreboding that Ahdal . would be chesen. The Sayad after being some time absorbed in thought raised his head, and after regarding all three, said-" The third is the appointed chief; and although Tor will do everything to oppose him, he shall not succeed; 'Speen is no way entitled to the chiefship." (That is, neither by primogeniture or promising talents.)

The Sayad then told Tareen to confer the Dastar (turban) on his youngest son, and the chiefship would remain for generations in his

3 Q

house. He also told Tor and 'Speen, that it would be for their good to obey Abdal.

Tor made many protests and objections; 'Speen silently took his leave. Tareen then placed the dastar on Abdal, and called for a blessing on him. He at last grew up, and disclosed all the qualities his mother and the Sayad had seen in promise. Tor and 'Speen were always called Tareens, and their descendants are now found in the district of Pishing, in the province of Candahar. Abdal lived 105 years, and his descendants were called after him "Abdalees" and not Tareens. He had two sons, Razad and Suleman. The Maghzan-ul-Afghanee says, one son called Jeer, others say Eesa.

When Abdal was advanced in years he sent for his son Razad, and appointed him his successor after giving him the following parting advice: "Do not forget your God, and conduct your public and private life accordingly. Treat with respect the tribe of Sarbannees, Sayads and learned and devout men; support and provide for your relations, and treat your subjects with kindness." That is to say, have a fair speech and a fat sheep for them, the grand secret of Afghan popularity.

Razad had three sons, Eesa, Alee and Ado. The first named was the youngest, and the two elder lived the life of Dervishes. Razad before his death appointed Eesa his successor, and his choice was confirmed by all the Sarbannees. Razad lived to the age of 120 years, having seen his descendants to the third generation.

Eesa had three sons, Meerak, Suleman alias Zeerak, (from his being forward of his age), and Noor. Eesa on his death approaching, collected, according to the custom of that time, the whole of his tribe and descendants, and appointed Zeerak, although his second son, his successor. Every one at once agreed but Meerak; who at last also did, after his father assured him that his choice was guided in a dream from heaven. Eesa lived 140 years. Zeerak had four sons, Barak, Alaho, Mase and Popal.

When Zeerak reached the age of 120, he called his descendants and tribe together, and requested their opinion regarding who ought to be his successor. They all pointed to Barak, and his father accordingly confirmed him, and he carried on the chiefship fifteen years during his father's life.

It was the custom of the tribe to change their encampment at different seasons, and every one was obliged to take his own baggage and property to the new ground. It so occurred that in one of these emigrations, Zeerak who from old age had become quite decrepit, was left behind.\*

The four brothers, according to custom, returned to the old encampment to see that nothing was forgotten. News was brought that Zee-rak had been left behind, being unable to move. Barak first arrived where his father was lying. Turning his horse's head towards him without dismounting, he abused him, saying, "Are you not dead yet, that I may be no longer troubled with you?"

Alako then saw him, and said, "Oh son of Adam, would that you were dead, and ceased to trouble us!" And then passed on, as had Barak. Mase next came, and, seeing his father, dismounted, and ordered one of his people to mount him on a horse and conduct him to the new encampment. Zeerak pleaded that he was unable to sit on a horse. Mase in a passion gave the old man a kick, saying to his attendant, "Let the old brute lie there to be devoured by wild beasts and birds."

At last came Popal, who immediately dismounted, and, taking Zeerak's head on his lap, brushed the dirt off his venerable face, and shed tears, and said, "Would to God that I had never been born, that I should live to see you, my father, in this plight." He then lifted up his father with great care, and, carrying him on his back, ordered his people to convey the baggage on ahead, and he would follow with his sacred burden slowly after. On arriving at the new encampment, he ordered suitable food to be drest for his father. When the old man had eaten and was refreshed, he expressed a wish to utter some prayers, to which he begged attention should be paid.

First he said to Barak: "Your fields will be many, but may you find no favour with God."

Regarding Alako he said: "May you never be free from cares and troubles."

To Mase he said: "May one of your houses fall as the other rises."

To Popal he said: "Be your descendants always chiefs and never servants, and may your foot never be out of the stirrup of wealth."

<sup>\*</sup> I witnessed something similar myself in the Ghiljye country in General Nott's advance on Ghuznee and Cabool. In a village that had been hurriedly deserted we found nothing but a cripple.

<sup>+ &</sup>quot; Bar," breadth (of domain.)

t " Barkat," luck, good fortune.

He then said, "I have already given, with the advice of the tribe, the chiefship to Barak, and it is no longer in my power, but theirs. But," (turning his eyes and stretching out his hands to heaven,) "may the descendants of Popal be always 'Raises,' and may the descendants of his brothers serve him." He then told Popal to be of good cheer, that the time was near at hand when he should become chief, and that the Sayad who had interceded in the dispute of Tor and 'Speen had appeared to him in a dream, and assured him Popal would be chief. After blessing him, he lived five years.

Six months did not elapse after the tribe had heard this blessing before they left Barak, and gathered round Popal who became chief, and Zeerak saw with his own eyes his prayers answered. Zeerak lived 89 years.

Popal became chief at 25 years of age. He was a very just and popular chief. In his time the descendants of Tareen mustered 30,000. In a revolution among the tribe of Kakers, the chief sought refuge with Popal, who with a force espoused his cause, reinstated his guest, and took hostages from the Kakers. From which time the Kakers never opposed the Popalzyes. He also took hostages from the Baloches and the Hazarahs. He ruled 65 years, and had three sons, Habeeb, Aiyoob and Bago. When his end was approaching, he assembled his tribe and appointed Habeeb, his eldest son, his successor, who lived 52 years. During Aiyoob's lifetime he and his sons lived with Habeeb. On his death, which took place before the other two, Bazo disputed with Habeeb for his having all the descendants of Aiyoob. The tribe interfered, and gave half to each.

Habeeb had four sons, Ismail, Hasan, Bame and Aboosaiced. The two former were much older than the two latter.

The daughter of Bazo was engaged to Bame. On Habeeb feeling his end approaching, he collected his tribe, and told them to nominate his successor. Ismail and Hasan, both canvassed the tribe for votes, and therefore both soon quarrelled. Bazo proposed Ismail, as being the eldest. Hasan would not hear of it. Bazo then proposed Bame, and proposed that he himself should act as regent during his minority. Habeeb agreed to this; Ismail and Aboosaiced would not agree, and separated themselves from the tribe.

Bame was accordingly appointed chief at the age of 15. After which Habeeb lived two years.

Bame lived to the age of 72; and had three sons, Nasrat, Basahma and Kane.

On Bame becoming aged, he neglected to nominate his successor as was the custom; the tribe therefore assembled, and demanded the reason. In reply he said, "I really do not see among my sons one worthy; but if I confess this to the Tor and 'Speen Tareens, they will not allow the chiefship to remain in the house of Abdal. Indeed I have heard from the Tareens that they had no hope in my sons. I will therefore not appoint a successor. I have also dreamt, that none of my sons will be chiefs, but that a grandson, a son of Kane, will be. If on my death any one of my sons be found with anything, he will get the chiefship without any nomination of mine. According to the dream, so it occurred; the sons of Bame did not agree among themselves, and there were separate small chiefs called "Katkhudas,"\* except in cases of blood or large general tribe feuds, when they referred to Kane. He lived to the age of 80; and had three sons, Bahlol, Zeenak and Bano. The tribe was for some time much distracted in factions and petty feuds. At last the chief men assembled, and decided, as there was no getting on without a "Rais" or "Sardar," they would appoint Bahlol. During the chiefship of Bahlol, Kane lived 12 years.

Bahlol lived 105 years; and had two sons, Maroof and Alee-khan; (the first time the title of khan occurs). Bahlol appointed Maroof at the age of 30 years, his successor. Maroof was very severe in his rule, and had the curses of his tribe: on which account he did not reign more than ten years, and then died of a severe complaint. His heirs in a short time ran through with all the property he left.

Two months after his death, one of his wives bare a son, by name Umar. His father and mother used to visit the Isakzye and Aleezye shrines for fortune for their son; Umar had no property. When Umar was about 14 years of age, the Abdalees of the hills made many seizures of lands, and many disputes and feuds arose in the tribe in consequence. The chiefs at last agreed to appoint Umar, who had now grown up, to divide the lands, and apportion them fairly, and to be their representative in all their communications with the Beglar-begee of

<sup>\*</sup> In the time of the Durance kings when the Khans received their pay from the treasury, they deducted from every horseman (Sahir) \(\frac{1}{4}\) rupee on account of the Katkhuda, who was an officer appointed to every 100 men to collect them when called for the service of the State.

Candahar. (This implies a Persian rule in that province). When Umar was one year old, Ako Aleezye, a noted person for sanctity in those times, with his son Khalo then 100 years old, and his grandson Mando, then 85 years old, came to the house of Umar's mother; who killed a goat and its kid, which was all she had for them. They in return prayed for her, and told her she would soon gain her heart's desire. Ako told her that he had seen two dreams regarding the child Umar; one was, that he had seen a lion enter the house of Umar, which meant that he would have a son, whose name should be called Asadullah, "Lion of God:" the second dream was, that he saw the house of Asadullah, who should also be called Sado, covered with a hog's skin. The mother of Umar entertained great apprehensions regarding the mention of the unclean beast; but Ako comforted her, by assuring her that the hog's skin meant wealth.

The Afghans (some) pretend to believe that Ako's dream of the hog's skin referred to the alliance formed by a descendant of Soda, (Shah Shuja-ul-Mulk) with the pork-eating English!! who entered Afghanistan with him in the Turkish year of the hog!!! (1839.)

The chiefs in pursuance of their determinaton waited on Umar, taking with them food for their own consumption as they knew the poverty of Umar, and appointed him their chief. His first care was, to settle the land disputes on a basis which ever after remained unshaken.

As chief, he held communication on the part of the tribe with the Beglar-begee of Candahar.

During his time the Barakzyes of the hills rebelled, and maltreated his emissaries sent to make the usual collections, saying, "The chiefship was given to us by our forefather, and Popal took it by force."

Umar immediately collected his force for the reduction of the Barakzyes, in which he succeeded taking hostages from them, as well as from some Noorzyes who bordered on the Barakzyes, and joined in the rebellion. He lived 98 years; and had two sons, Asadullah (Sado) and Saleh.

Another informant, an Alcezye chief says, Sado after being blessed by Ako, who was a disciple of Sakhee Sarwar's, found a treasure, and by means of it gained influence in the tribe. If this story be a fabrication, it at least betrays a knowledge of the Afghan character.

In 1841, there was in Cabool a Salehzye, named Hajce-khan, who said he was the last of his tribe. He and Taizulla-khan of Candahar, now



dead, a brother of my Alcezye informant, were reckoned almost the only men in Afghanistan who possessed a knowledge of Afghan history.

Some say, that Umar was told in a dream by a vision of his forefather Eesa, to name his sons Saleh and Soda. Saleh became the disciple of a saint, gave up the world, and passed his time in austere devotions.

When Umar reached the age of 89, Sado being 25 years old, and Saleh 60, he collected his tribe and informed them that as his end was approaching, he must name a successor. That as for Saleh, he had given up the world, and was in no way adapted for the chiefship. That Sado had been nominated by the Aleezye Fakeers, Ako, Khalo and Mando, and was moreover thought by him the most fit. The tribe immediately confirmed, as did Saleh who, when doing so, spoke these words: "I have five sons; Durkhan, Ibrahim-khan, Bazeed-khan, Maya and Alo, who again have children. Let Sado exempt the whole of my descendants from taxation of every kind as long as the chiefship remains in the house of Sado." This was agreed to by Sado before his father and the tribe.

Umar and Saleh then girt Sado's loins. This is still a custom in Afghanistan. On a king ascending the throne, some saintly character of great fame is sent for, who undoes his own "langootee," and puts it round the waist of the king, who in return invests the saint with a splendid dress of honor. Sado's turban was then put on by Alee, the son of Mando Aleezye, and all the people prayed for his long life and prosperity.

Some time after the accession of Sado, Khaja Khidr and Ismail, grandsons of Neknam, a Barikzye Malik, rebelled against his authority, and refused to admit his "Mahsals," revenue collectors and bailiffs, into their districts; on the plea that their progenitor Barak ruled for fifteen years, and that Popal got the chiefship unjustly, and by boyish blandishments. They agreed to give a sheep or two now and then, according to their ability, but would not agree to the daily demands and constant sending of Mahsals, some of whom they forcibly ejected from their districts. On hearing this, Sado became furious, and collected his force. Other Barikzyes came and begged forgiveness, entreating Sado not to attend to what a few fools or madmen said; and promised themselves to punish their rebellious fellow tribesmen. By this Sado was pacified, and appointing other chiefs, and giving them his countenance, deputed them to punish

the rebels, which they faithfully did. Khaja Khidr being slain, some Kutezyes also evinced a rebellious spirit; and were chastised, and security for their future good behaviour was taken. The other tribes profited by the example. Sado behaved liberally to all who acknowledged his authority, and punished all severely who disobeyed him. He listened to the petitions of the poor, dispensed justice strictly according to the Shara, was pacific in his policy, and protected his subjects. His government was established over the Abdalees on a basis that had never been in a like manner secured by his forefathers.

When at leisure from the Abdalees, he subjugated, partly by conciliation and partly by force, the tribes of Ghiljyes and Hazarahs, in whose disputes he was sole arbitrator. He built several mosques and schools, as well as many works of utility, such as bridges, wells, and roads.

He lived in all 75 years; and had five sons, Khaja Khidr-khan, Moudood-khan, Zafran-khan, Kamran-khan, and Bahadur-khan.

Khaja Khidr-khan and Kamran-khan are said to have been of one mother, and Zafran-khan of a slave girl.

The Bahadur-khels settled in Multan, where and at Dera Ismail-khan and Tak-i-Sarwar-khan, there are some remains.

Muzaffar-khan, governor of Multan, was a Bahadur-khel.

The Kamran-khels were divided into Eesa-khels and Moosa-khels.

Usman-khan, who was Shah Shuja's vizier in 1841, traced his descent as follows, from Kamran, viz.: Usman, the son of Ramatullah, Shah Zeman's vizier, the son of Fatullah, the son of Haroon, the son of Yoosaf, the son of Yakoob, the son of Moosa, the son of Kamran.

Walee Mahammad-khan, another Sadozye of rank at Candahar, who also gave me some information, traced his descent from Kamran, as follows: Walee Mahammad, the son of Abdu Salam-khan, who was a brother of Abdul-khalik-khan, (who rebelled against Shah Zeman), the son of Rahman-khan, the son of Abdullah-khan, (who, according to some, gave his daughter in marriage to Meer Wais Ghiljye, who had two sons by her, Shah Mahmood and Shah Husen, receiving in marriage in return Meer Wais's daughter), the son of Jafar Sultan, (whose residence and control was at Potye-i-Sadozye and Shahr-i-Safa by one account, whose wife named Durkhee gave her daughter Khanzad to Meer Wais's mother for her son), son of Eesa, son of Kamran.



The two first of Sado's sons were the most forward and talented, and the other three were not much noticed either by their father or the tribe, some of whom inclined to Khaja Khidr-khan, and some to Moudood-khan. When Sado grew enfeebled through age, he collected his tribe, and told them to choose among the two. Moudood-khan being the eldest, was elected chief; but Sado remonstrated, saying, "Although Khaja Khidr-khan is the youngest, yet he has more noble qualities than his four brothers. I also saw a dream regarding him, as follows:

"After midnight, an old white-bearded man with a green stick, and a green wrapper round him, made his appearance. The effulgence of his countenance was such, that I fancied a light had been brought into the room. Steadfastly regarding him, I hardly knew whether I was awake or was seeing a dream.

"I started—awoke, and arose, as did my wife; I then enquired from the vision, 'why he had honored my humble house by entering it?' He replied, 'Be joyful, for God will give you a son, whom you must call Khaja Khidr; who shall so excel in every good quality, that men shall be unable fully to sing his deserts.' On asking the vision his name, he evaded the question; I prest him, he at last replied, 'The child is to be called after me.' He then took his departure, and I followed him some paces, when dismissing me he shortly vanished from my sight. On my son's birth, I called him Khaja Khidr. Now although I love all my sons equally, yet, on account of my dream, I incline to think him fittest to be chief."

The Sarbannees however still persisted in their choice of Moudood Khan.

Khaja Khidr-khan then proposed, that the tribe should range themselves on his or his brother's side as they chose. The Sarbannees would not agree to this, saying with great truth, that a division would be prejudicial to the general interests of the tribe. It was finally, settled, that Moudood-khan should be chief, and Khaja Khidr-khan his deputy.

During the lifetime of Sado their father, the former delegated all his powers to the latter, and merely retained the name of chief; but on the death of Sado ) tribe with one consent transferred the chiefship to Khaja Khidr-khan, who became very popular, being approved of by the saints, and being talented, conciliatory, and liberal.

Khaja Khidr-khan became chief at thirty-five years of age, and ruled forty-seven years. He had two sons, Khudadad Sultan and Sher-khan. This is the first time the title of Sultan occurs. He is known among the Afghans as Sultan Khudakye, who divided the lands of the Abdalees and Ghiljyes at Pul-i-Sangee with Sultan Malakhe Ghiljye.\* This title of Sultan, I have reason to suppose, was conferred by Aurangzeb.† Khudadad Sultan, on the death of his father Khaja Khidr-khan, became chief without any opposition from his brother.

He soon afterwards invaded the territory of Jyob, and laid it waste while the inhabitants fled to the hills. On his return, a man of the country and his three children were intercepted in a ravine, unable to flee; when brought before him he immediately ordered them to be killed, although they appeared innocent and godly people.

Pitching his camp near the spot, at night he saw a vision. The four murdered persons appeared, and threatened him with the death he had so unjustly inflicted on them. Terror had taken possession of his soul, when the same vision with the green stick and green garment that had appeared to Sado made his appearance, and, after reproaching him with his tyrannical act, promised to save him, provided he would immediately abdicate in favor of his brother Sher-khan, and act as his deputy. Khudadad Sultan awoke in great dread, and assembling his attendants and followers, renounced the chiefship in favor of Sher-khan, and informed him he had done so by an express courier or "Chapar."

During the chiefship of Khudadad Sultan a friendly communication was sustained with the Beglar-begee of Candahar, but soon after Sher Khan's accession it received a sudden check in the following manner.—
The Beglar-begee of Candahar had sent a force towards Foshanj (Pishing) to collect the taxes on land and sheep, called Maldaghees and Sargalye. Having finished their collections, they were returning to Candahar. On arriving at the Kojak Pass they were attacked, defeated, and nearly all slain by the Abdalees: some fled, but were pursued, and, being overtaken, lost their horses and clothes.

<sup>\*</sup> The dispute was regarding the two districts of Omakye and Gwaharye, and is said to have been settled by a shepherd, appealed to by both parties, on the simple principle that Khudakye and Gwaharye sounded well together as did Malakhe and Omakye.

<sup>†</sup> I have seen the original Rukum of Aurangzeb to Sultan Malakhe, giving him charge of the King's road from Kalat to Karatoo, to keep it clear of the Hazarah robbers.



On the Beglar-begee hearing of this, he wrote to Sher-khan, requesting him to send the culprits to Candahar. Sher-khan made excuses, saying, that Beeloches, Kakers, and other migratory tribes inhabited the neighbourhood of the Kojak, and the real depredators were therefore difficult to discover. The Beglar-begee enraged at this, by way of reprisal, attacked and plundered the Abdalees who inhabited the neighbourhood of Candahar. Sher-khan on hearing this collected his tribe, and both parties arranged themselves for hostilities.

At this time Pishing, Sharabak, Shawl, Harnye, and Mastung were all dependencies of Candahar. On this difference arising, all communication between Candahar and these places was stopt; and on Sher-khan succeeding, which he did, in gaining possession of Shah Safa, a post only nine farsakhs from Candahar, the communication with Kalat-i-Ghiljye, the Ghiljyes, and Hazarahs, was also cut off.

In this dilemma the Beglar-begee wrote for instructions from his master, the king of Persia, who in reply ordered him to look out for some rival chief in the same tribe and patronize him.

The Beglar-begee sought out and found Shah Husen-khan, a cousin of Sher-khan, on whom the king of Persia conferred the title of a Prince-royal, viz. Meerza.

Meerza Shah Husen took up his residence at Deh-i-Shekh, and Sher-khan at Shahr-i-Safa, and thus the first division among the Abdalees took place. The tribe often remonstrated with Shah Husen Meerza, and protested against Mogul interference. As he stoutly denied being under Persian influence, he had adherents in the tribe as well as Sher-khan; indeed the Abdalees constantly said they did not care which brother they obeyed so long as the Moguls (Persians) did not interfere.

Jaleel Aleezye was Shah Husen Meerza's right-hand man, and was always deputed by him to Candahar to negotiate with the Beglar-begee. Some years past in this manner. On Jaleel taking his leave after one of his visits to Candahar, the Beglar-begee entrusted him with the following message for his master Shah Husen Meerza: "The king of Persia, my master, has honored you by adopting you as his son, and has conferred on you the princely title of Meerza; you have 30 or 40,000 men. I also have a force, and every day fresh orders come from my master for the destruction of Sher-khan's power: believe me, our delaying any longer can only do us harm at court."

The Ameens of the Chaghatye monarch in Eastern Afghanistan heard of this and reported it to their master, the king of Dehli, and pointed out that Sher-khan was a man of great influence in his tribe who had excited the wrath of the king of Persia by opposing his cousin Shah Husen Meerza, who was supported by that monarch, and was on that account disposed to receive the protection of the king of India, which they strongly recommended should be extended to him.

This recommendation brought letters of encouragement, and the title of Shahzadah for Sher-khan from the Emperor of Delhi, who enjoined the Soobhadar of Cabool and Hakim of Ghuznee to afford Sher-khan assistance whenever he required it.

On receiving these honors the power of Sher-khan increased, and Meerza Shah Husen's declined in proportion. This was to be expected, for the Afghans would naturally prefer the Sunnee king of Delhi to the Sheeah king of Persia: and doubtlessly Sher-khan immediately indented on the Governors of Cabool and Ghuznee for dresses of honor for his adherents, and created a rival of popularity by this means also in the tribe.

Jaleel Aleezye was immediately despatched with this intelligence to the Beglar-begee of Candahar, who reported it to his master the king of Persia. In reply, a horse and a dress of honor were sent for Shah Husen Meerza, and dresses of honor and letters of encouragement for his adherents were despatched by the hands of Jaleel Aleezye, who was also bearer of a message to Shah Husen Meerza from the Beglar-begee, which was, that the Beglar-begee had much wished to come himself to visit the Abdalee chief, but was prevented by the unquiet state of some of his districts, and hoped that he would be able to come to Candahar. An interview had often before been talked of, but Shah Husen Meerza always, when invited to Candahar, excused himself, pointing out the advantages his rival, Sher-khan, would gain in his absence from the tribe. This time, however, flattered by the receipt of the king of Persia's presents, and burning with jealousy at the increasing power of his rival, he consented. The tribe, hearing of his intention, assembled, and said, "You may go to Candahar of course, if you like; but we warn you that something may take place to our detriment, such as a dispute or a quarrel with the Moguls." Shah Husen Meerza, notwithstanding the warning, set out for Candahar; and appeared at the Beglar-begee's durbar.

AART

Jaleel Aleczye always stood with his hands joined in the presence of Shah Husen Meerza, his master; but as he was Wakeel at Candahar, the Beglar-begee allowed him always to sit, as he did on the present occasion.

Jaleel was a handsome and clever-spoken man; Shah Husen Meerza was slow-speaking, black, and short.

Jaleel constantly introduced his own opinions in the conversation, and was told by signs to be quiet. These had no effect, and he more than once interrupted what his master was saying; took the words out of his mouth, and finished his sentence for him. Shah Husen Meerza, unable to contain himself, at last said, "Slave of low origin, what does this disrespectful behaviour, and these interruptions mean?"

Jaleel foolishly allowed himself to reply, "A slave is always known by

Quick as thought Shah Husen drew his dagger, and sheathed it in the body of Jaleel, who expired immediately, his entrails protruding on the carpet. On witnessing this tragedy, the Beglar-begee and whole court rose hastily, partly in alarm and partly in rage. Shah Husen Meerza no sooner observed this than throwing away his dagger, he said, "Be not concerned; that slave has only paid the forfeit of his impertinence."

As he was the adopted son of the king of Persia, they contented themselves with putting him in restraint; while they reported the tragedy, and waited for instructions.

A decision arrived from the king of Persia to the effect, that Shah Husen Meerza was quite right in killing his slave, if he offended. Fresh dresses of honor were despatched with a letter of encouragement to the prisoner, who was ordered to be released immediately, and sent to his government. This favor, however, came too late; the mischief had been done already, for during Shah Husen's confinement the whole tribe of Abdalees had gone over to Sher-khan, and acknowledged his authority.

Meerza Shah Husen therefore, on obtaining his release, went direct to Sher-khan, and, acknowledging his authority, expressed his determination of proceeding to Hindustan; which he soon after carried into effect, leaving Sher-khan in absolute undisputed possession of the chiefship.

When the Beglar-begee heard of this he wrote to the king of Persia, who sent a letter to Sher-khan, couched in these words: "There is bro-

therhood between my house and that of the Koraganee; if you have been made a Shahzadah by the king of Delhi, I also adopt you as my son, and allow you full authority over your own tribe independent of the Beglar-begee; but if he is attacked, or otherwise requires your assistance, give it him."

Sher-khan accepted these honors, and appointed as naiks or deputies, Badal Baneezye, and Meer, son of Mubarak, son of Jalaludeen Alakozye.

The Beglar-begee at intervals sent people to make complimentary enquiries after Sher-khan's health, and requested that the deputies Badal and Meer should attend on him at Candahar.

Meer Alakozye was alone sent, and directed, if enquiries were made for Badal, to make an excuse that he was ill, and to say that he would make his appearance on his recovery; or if that should be retarded, some one should be sent in his stead. Meer arrived, and had an interview with the Beglar-begee, whom he found preparing a force to collect the revenue of the districts of Shorabak, Pishing, and Huruge, viâ the Kojak Pass.

Meer, being presented with a dress of honor and a horse, sent a small detachment of his own men in company with the Moghul troops, who saw them safe across the Pass, and overawed the above districts into payment of revenue, for which assistance he received further khiluts and his leave.

A difficulty however arose, which was, to get the Persian detachment with their collections across the Pass on their return to Candahar.

Sher-khan was therefore again written to, who this time despatched Badal Baneezye with an introduction, which, after the detachment had been by him seen safe across the Kojak, procured for him a dress of honor and two horses.

He received his leave and charge of seven horses with golden trappings, and various pieces of rich Persian stuffs for his master Sher-khan, which had been sent by the king of Persia with an encouraging letter.

Sher-khan became chief at thirty-two years of age, and lived in all sixty-five years; and had one son, named Sarmast-khan.

When he was twenty years of age, his father Sher-khan being much addicted to the chase, went one Friday out hunting, and had a fall from his horse; his attendants taking him home senseless. On opening his eyes, and seeing Sarmast-khan, he desired Bakhtyar-khan,

grandson of Saleh, might be sent for. On his arrival, he thus made known his wishes to the couple: "My recovery is out of the question: therefore, as Sarmast-khan is but a boy, I appoint you, Bakhtyar-khan, his guardian; let him follow my example. And do you, Sarmast, attend to the advice of Bakhtyar-khan, and appoint him your deputy should you ever be absent from your tribe; and, remember, be liberal. I have spent my life as heart could desire; I have nothing to regret not having done. I have so behaved to the tribe, foes, and friends, that they will never forget me. If a friend and a foe quarrelled in my presence, I never decided so, that favor if existing should appear; and at other proper times, I have so treated my friend, that the people flocked to him; so that whenever a foe appeared, so many friends arose for me, that he became powerless. If any one in the tribe belied another, or aspersed his character, I never publicly exposed either, or lowered a friend in the eyes of the people."

Sher-khan died three days after this. Sarmast-khan faithfully followed the precepts his father had taught him. He lived in all 50 years. He had three sons, Doulat-khan, and two others whose names are not known, as they died without issue.

On the death of Sarmast-khan, as Doulat-khan was quite a boy, Haiyat Sultan succeeded to the chiefship of the tribe. He was a cousin of Sarmast-khan's. He also conducted all communications with the Beglar-begee of Candahar.

This latter once made a feast, and invited to it all the Afghan chiefs, Kat-khudahs and Sar-khels, to meet his own Moghul Sardars. Wine was introduced, and ceremony thrown aside. Haiyat Sultan and the other Afghans were induced to join in the revelry, and, as they were not so accustomed to the juice of the grape as their entertainers, soon got intoxicated. From the praises of wine it was not long before the company entered upon the praises of woman; each party, of course, becoming the champions of its own countrywomen. At last proposals for Intermarriages were made, and agreed to by both parties. Seven Afghan daughters were betrothed by name to as many of the Persian officers, and vice versa, and dresses of honor were given to their Afghan fathers-in-law that were to be. Next morning Haiyat Sultan on getting sober, became painfully aware how he and his companions had committed themselves, and was at a loss how to leave Candahar. In this dilemma

Mubarik, one of the Afghan Kat-khudahs, a man of experience and expedients, suggested that the Persians should be told that it was their custom that the bridegrooms should visit the houses of the brides,\* the consent of whose relations would also be first required.

The Afghan chiefs thus got their leave, and they returned to their tribe, accompanied by some of their would-be sons-in-law, and several matrons to attend the brides, and bring them to Candahar.

On the news of these mutual engagements spreading, the whole of the Sarbannees and Abdalees besieged Haiyat Sultan on his return, and a council was held.

Doulat-khan had by this time grown up, and had his seat in all the councils (piijahs.) On the present occasion, after paying all due deference to his uncle, he proposed to try the Moghuls to suggest they should first give their daughters to the Afghans. This was proposed accordingly. The Moghuls however replied, that their daughters were far off at Ispahan, while those of the Afghans were close at hand, and could be according to agreement married, while theirs were being sent for. The rude Afghan chiefs were led by this to believe, that the intentions of the Moghuls were not honorable; and they called on Haiyat Sultan, who had brought them into this scrape, to get them out of it.

Haiyat Sultan saying, as he had been for a long time friends with the Beglar-begee he could not give an unbiased opinion, rose from the council and sought his private apartment, deputing Doulat-khan to act in his stead.

Doulat-khan's speech was a true Afghan one. "If," said he, "you take my advice, you will sacrifice four of these Sheeah Moghuls to our four Sunnee Yars, (four first caliphs, excluding Alee the fifth, the favorite of the Sheeahs,) as a punishment for their presumption; and hand the matrons over to Masoor Baneezye, who will provide for them." This method of cutting the gordian knot of their difficulties being highly approved of by the assembled simple, hospitable, and brave chiefs, the throats of four of their principal guests were cut.

On this treachery reaching the Beglar-begee, he wrote reproaching Haiyat Sultan, who excused himself, and laid the blame on Doulat-khan. The Persian governor then challenged Haiyat Sultan to prove his non-

<sup>•</sup> When they are very high in rank, they send their swords instead, to represent their persons.

CENTRAL LEGARY

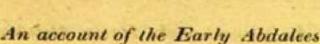
participation in this foul massacre by coming to make friends with him again at Candahar. This he excused himself from doing, saying he would not be permitted to do so by the tribe.

All retribution or apology thus being withheld, the Beglar-begee collected a force under one of his chiefs, named Farrukh, and despatched it against the Afghans, and a great battle was fought at Yaggak, in which the Persians were defeated, and their commander killed. The Beglar-begee believing the old saying, that "the painter's second drawing is the best," sent another force, before the Afghans thought he would have heart or power to collect it, and fully retrieved the former defeat, and effectually punished the Afghans' perfidy. Haiyat Sultan retired to Hindustan. He had two sons, Abdulla-khan and Khan Mahammad-khan. Abdulla-khan had four sons, Allaiyar, Sadullah, Khan Mahammad, and Alee.

Khan Mahammad-khan had two sons; Raheem-khan, who fled to the Deccan from Ahmad Shah, and was not after heard of, and Akbar Shah, blinded by Ahmad Shah, whose son was Khan-i-khanan. During Doulat-khan's time the Beglar-begee was recalled by the court of Persia, and another governor sent in his stead, with whom Attal and Izzat Sadozyes and Meer Wais-khan Ghilgye intrigued against Doulat-khan, while they pretended to be his friends. Their object was to set aside Doulat-khan. The two Sadozyes becoming chiefs of the Abdalees and Meer Wais-khan of the Ghiljyes; having at last succeeded in imbuing the mind of Doulat-khan with suspicion of the Beglar-begee, and in incensing the latter against him.

Doulat-khan was suddenly besieged in a smæll fort on the outskirts of his tribe, taken prisoner, and with his son Nazar-khan, and favourite and confidential slave, Fakeer, put to death. His tomb is in the Razabagh at Kohak near Candahar. He left two sons, Rustam-khan and Mahammad Zuman-khan. Nazar-khan is said to have been Doulat's brother by some.

On this occurrence Rustam-khan sought the tribe, and gained such influence there as to make the Beglar-begee anxious to secure his friendship. He therefore wrote, proposing that the past should be buried in oblivion, and that his two principal advisers, Sarwar-khan Baneezye, the son of Bukhtyar-khan, and Katak Kootezye Alakozye, should be despatched to Candahar to arrange the terms of friendship and alliance. They were despatched, and, on their return with dresses of honor, gave



such a favourable account of their reception as to induce their master to accept the invitation of the Beglar-begce, of which they were the bearers.

Rustam-khan was confirmed in the chiefship by the king of Persia; he kept on such good terms with the governor, and was held in such high estimation by the whole Moghul force, that many swore by his head.

A rebellion broke out among the Beeloches, and, as was usual, Rustamkhan was called on to despatch a small Afghan detachment with the Moghul troops, which latter were defeated. This was taken advantage of by Hajee Meer Wais-khan Ghiljaee, and by Attal-khan and Izzatkhan Sadozyes, who were Rustam's rivals at court; and the Beglarbegee was by them persuaded that the defeat of the Moghul troops had been arranged between the rebels and the Afghan chief. Rustam-khan was therefore coaxed to court, and thrown in prison. He was, after suffering great privations, released, on his three rivals promising to murder him.

Hajee Meer Wais excused himself from being the executioner, on the plea, that should his Sadozye co-adjutors commit the deed, a bloody feud in that tribe would be the result, which would be favorable to the Persian power.

Izzat was also found to have some spark of patriotism left, and therefore Attal became the murderer, some say, partly in revenge for the death of his uncle, Jafar Sultan.

Rustam-khan only ruled four years, and left no issue. His tomb is also in the Razabagh, at Köhak, near Candahar. Mahammad Zamankhan was at this time in Kirman.

Hajee Meer Wais-khan was the son-in-law of Jafar Sultan Sadozye Kamran-khelee. Doulat-khan had Meer Wais' father as a hostage. In Jafar Sultan's time his wife, by name Durkhee, gave her daughter, Khanzad, to Meer Wais, and it is said that one of the objects of Hajee Meer-khan's visit to Ispahan was to get the chiefship of the Abdalees for his brother-in-law.

In the insurrection organized by Hajee Meer Wais-khan, after his return from Persia and Mecca, in which the Beglar-begee, Shahnawazkhan, was murdered. The Abdalees cordially co-operated in the understanding that, if successful, they were to share power, lands, treasures, &c. CONTRAL LIBRARY

equally with the Ghiljyes. This latter party, however, played them false, and the Abdalees took arms. A great battle was fought between the rival tribes near Algabad in the Dasht-i-Boree, in which the Ghiljyes were victorious, and the Abdalees, under Sadulla-khan Sadozye, fetired to Herat, of which they became masters by profiting by the dissensions inside. Others say, that one Allaiyar-khan was the Sadozye chief, who got possession of the citadel of Herat by disguising some fifty followers as merchants with a caravan.

Shah Mahmood Ghiljye, the son and successor of Meer Wais, it is said, made an attempt to take Herat from the Abdalees, and for that purpose advanced to Nawah on the Helmand, where he was met by the Herat force under Sadulla. A battle ensued, in which the latter was killed, and Shah Mahmood returned to Candahar. He next year again advanced on Herat, as far as Giranee, on the Farrah Rod. Here he was met by a deputation from Herat sent by Sadulla's mother, who was a sister of his mother, \* which induced him to change his plans and to proceed via Seistan to Kirmam.

By the other account Allaiyar-khan is said, after getting possession of Herat, to have put his brother Zuman-khan and all his sons to death, and that Ahmad alone escaped, by being an infant in the cradle. His mother, who was an Alakozye, took him to Hajee Ismail Aleezye, the Beglar-begee of Herat, and, by promising him her daughter for his son, got him to intercede with Allaiyar to spare the infant's life. Hajee Ismail shewed the child to his Peer, a spiritual father, Mulla Usman, an Alakozye Akhund, who foretold that he would be favoured of God.

On Ahmad growing up, many of the Abdalees flocked to him, which causing Allaiyar uneasiness, he had them all put to death: and Hajee Ismail had his protegé conveyed to the neighbourhood of Subzwar and Farrah, and there kept concealed. Allaiyar-khan's wrath was thus turned on the Hajee whom he was waiting the first favorable opportunity of killing. when Nadir Shah appeared in the field and attracted the attention of all Khorasan.† Mulla Usman was called upon to foretell events; which

Khanzad was Mahmood's mother, and Sadulla's mother must by this have been a second daughter of Durkhee and Jafar Sultan.

<sup>+</sup> My Aleezye informant makes Allaiyar the governor of Herat about this time, while a descendant of Shah Husen assures me that his name was Sadulla. Again, that Mahammad Zuman-khan was once governor of Herat there is no doubt, his tomb is now there. In the History of Persia, Mahammad-khan, the governor of Herat, is mentioned as having been sent by the king of Persia with overtures to Meer Wais on

he did, by assuring them that 6,000 Afghans would be led into captivity by the Persian conqueror, and that this visitation of the Almighty's wrath was caused by the cries of one poor Noorzye shepherdess, who in vain entreated her harsh mistress to give her in-door work, instead of the hunger and cold of the bleak mountains. In the course of time, Nadir Shah appeared before Herat, which he besieged for fourteen months, leading into captivity 6,000 Afghans, men and women, which he distributed throughout the town of Persia, employing the boldest and most able-bodied in his army.

Their chiefs at this time were Ghanee-khan Alakozye, and Noor Mahammad-khan Aleezye.

Nadir Shah had been besieging Daghistan for eleven months without success, and his temper became accordingly soured, when one day a shot from the besieged ramparts was so admirably thrown as to fill the dishes Nadir Shah was dining off in his tent with dust. This gave the climax to his wrath; and he ordered the chiefs of the captive Abdalees to be summoned. Among them, besides the two above-mentioned, were Hajee Jamal khan Mahammadzye, and Janoo and Manoo-khans Noorzyes. Nadir Shah informed them, swearing by Sultan Alee Moosa, that they would all be massacred should they fail in becoming masters of the fortress within twenty-four hours.

The Abdalees seeing their case desperate, swore to die like men, and sent a communication to the besieged, desiring them to evacuate the fortress within six hours, which, being of course laughed at, the Abdalees prepared for the attack. This was so sudden and so desperate—the Abdalees still passing on over the dead bodies of 600 of their brethren—as to inspire the besieged with a sudden panic, which did not subside until they had gained the outside of the fort in their retreat. Nadir Shah was so pleased, that he ordered the Abdalees to ask any favor of him. "Revenge us on the Ghiljyes of Candahar, and give us their lands," was their first request, and "release our captives," was their second. Both were granted, and orders were given to collect the Af-

his insurrection. Again, it is mentioned that in the time of Shah Mahmood Ghiljye of Candahar, the Uzbecks invaded Khorasan, and were joined by Azadullah (Sadulla?) Duranee chief of the Hazarajat, who had been formerly dependent on Herat, but who had been estranged by an insult offered him by the governor of Herat, Mahammad Zuman-khan. A Persian force of 30,000 men advanced to Herat, and defeated the Uzbecks; but was in its turn defeated by the Afghans, 15,000 in number, under Azadulla, who retained possession of Herat and its dependencies.

ghans from all parts of Persia; wives were restored to their husbands, and daughters to their fathers: only one Aleezye was left to mourn a wife, who in his grief sought his chief, Noor Mahammad-khan, who had the title of Meer-i-Afghan. Every diligence was made in searching for her, and she was at last discovered to be in the harem of Nadir's own son. Noor Mahammad, emboldened by the past favors of that monarch, represented the case to Nadir Shah at his next interview, who thought to keep his word, and at the same time avoid the disgrace of a lady who had once entered Nadir's harem leaving it, by promising that she should accompany her former husband back to his country, if she should be so inclined; calculating that the delicate food and rich attire, &c. &c. that she had been accustomed to in his harem would disgust her with her rough and greasy husband. In this Nadir was disappointed, for in the interview allowed the couple on the Afghan appealing to her to enable him to hold up his head again among his "Siyal," (equals in society,) she decided for returning home. This the king allowed her to do with all the goods and chattels she had become possessed of.

On Nadir Shah's marching on Candahar, Allaiyar opposed him at Sabzwar, and was killed.

Hajee Ismail was sent for by Nadir, and ordered to bring Zamankhan's son to the presence. This he did after Nadir had sworn that he would not injure him.

It is said, that on Ahmad-khan first making his appearance before Nadir Shah, the latter was so forcibly struck with a presentiment that he would be king, as to have required an oath from him that he would not molest his descendants.

He ordered him to be in constant attendance, and conferred on him a golden staff set with jewels.

On Nadir Shah taking Candahar, the Afghans reminded him of his promise regarding the Ghiljye lands. Ghanee-khan Alakozye got the rich valley of the Arghandah for himself and tribe, while Noor Mahammad-khan secured the fertile valley of Zemindawer for his Aleezyes. The Barikzyes of the present day in pointing to the high and dry lands that fell to their lot, bitterly regret that they were at that time not properly represented at Nadir's court.\*

\* Nadir Shah divided Candahar into 3000 kulbahs, which he called Arbabee: each kulbah containing 100 tanabs, and each tanab being 60 yards square. From each kulbah of these Tavelce lands sown by four kharwars (40 maunds) seed, he required

Ahmad-khan accompanied Nadir Shah in all his campaigns, and was present in camp at the time of that monarch's murder. How he succeeded in becoming Ahmad Shah by means of one of Nadir Shah's cash remittances from Hindustan that fell into his hands, belongs to his own history, and nothing is left to note but the patriotism of Nadir's old Afghan officers.

On their being summoned to the upstart court of Ahmad Shah, to give their advice for the consolidation of the rising Duranee\* power, "First," was their reply, "raise a body of 12,000 foreign Persian troops as your ghulam-khanahs (slaves of your will,) as a check upon your Duranees; and, secondly, have us put to death, as we are too powerful, and stand in your way."

Their advice in both cases was taken by Ahmad Shah!

two horsemen. He gave the outskirt lands in Tavel to the Duranees, and the rich suburb lands he assessed at one-tenth of the produce, after the following unfair experiment in the lands under the walls of Candahar, which had on account of preceding anarchy lain fallow for three years, whereas the land was always deemed and termed "doo aish," that is, two kulbahs were alternately cultivated year about. He appointed his own men to sow one kulbah with five kharwars of seed after ploughing it seven times; and because the outturn was 100 kharwars, he unfairly made a fixed settlement of one-tenth, being ten kharwars grain, and ten kharwars straw (bhoosah.) The Afghan's hereditary lands are called mouroosee or kosai.

\* Ahmad Shah assumed the title of Dur-i-Duran, "pearl of pearls," notwithstanding his Peer, or spiritual adviser, suggested Dur-i-Douran, "pearl of the age."



## Proceedings of the Asiatic Society of Bengal, June, 1845.

The stated monthly meeting of the Asiatic Society was held at the Rooms, at ½ past 8 p. m. on Tuesday the 17th June, Charles Huffnagle, Esq. senior member of the Committee of Papers, in the chair.

The proceedings of the May meeting were read, and with a few additions and corrections confirmed.

Read the following list of Books presented, purchased and exchanged during the last month:

Books received for the Meeting of Tuesday, the 17th June, 1845.

#### Presented.

The Meteorological Register, for April, 1845.

The Oriental Christian Spectator, Nos. 5 and 6, for May and June, 1845.—By the Editor.

The Calcutta Christian Observer, for June, 1845.—By the Editors.

The London, Edinburgh, and Dublin Philosophical Magazine, and Journal of Science, for January, 1845.—By the Editor.

The Edinburgh New Philosophical Journal, October, 1844, to January, 1845.—By the Editor.

Proceedings of the Academy of Natural Sciences of Philadelphia, for March and April, 1844.—By the Academy.

Ditto, ditto, ditto, for May and June, 1844 .- By the Academy.

An Address to the Students of the Benares College.-By J. Muir, Esq.

Brief Lectures on Mental Philosophy, delivered in Sanskrit.-By J. Muir, Esq.

Annales des Sciences Physiques, et Naturelles D'Agriculture et D'Industrie.—By the Royal Agricultural Society of Lyons, Vol. 6.

Archæologia or Miscellaneous Tracts relating to Antiquity, Vol. XXX.—By the Archæological Society.

Index to Archæologia, from Vol. XVI. to XXX.—By the Archæological Society.

Magnetical and Meteorological Observations.—By the Honorable the Court of Directors.

Prasastiprakásika.—By the author, Krishnolall Deb.

Supplement to the Glossary of Indian Terms.—By H. M. Elliott, Esq. Civil Service, from the Government N. W. P.



Calcutta Journal of Natural History.

Journal of the Agricultural and Horticultural Society of India.

Journal Asiatique, Vol. VI.

The Athenaum, for March 29th, 1845, and 5th, 12th, and 19th April, 1845.

Purchased.

Mantell's Medals of Creation, Vols. 1 and 2.

The History of Etruria, Part II.

The History of the Reign of Tippoo Sultan, translated from an Original Persian MSS.

The Classical Museum, No. VII.

The Annals and Magazine of Natural History, April, 1845.

Journal Des Savans, November and December, 1844.

Illustrations of Indian Ornithology.-By T. C. Jerdon, Esq.

The Asiatic Journal and Monthly Register, for the years 1841, 42, 43, 44, and the first No. of 1845.

Map of the Kuree Vesetra.—By Lichashahaba.

Read the following letter accompanying the very valuable and curious work to which it refers :-

#### No. 413.

FROM J. THORNTON, Esq. Secretary to Government N. W. P. To the Secretary, Asiatic Society Calcutta, dated Agra, 21st April, 1845. GENL. DEPT. N. W. P.

SIR .- I am directed to transmit to you, for the Society's use, a printed copy of Supplementary Glossary of Indian Terms prepared by Mr. H. M. Elliot, Secretary to the Sudder Board of Revenue N. W. P.

J. THORNTON.

Agra, 21st April, 1845.

Secretary to Government N. W. P.

Read the following letter accompanying the paper to which it refers which was handed to the Editors of the Journal for publication :-

(No. 1353, of 1845.)

FROM F. CURRIE, Esq. Secretary to the Government of India.

To the Secretary to the Asiatic Society, dated Fort William, the 9th May, 1845.

FOREIGN DEPT.

SIR,-In continuation of my letter to your address, No. 1289, dated the 2nd instant, I am directed by the Governor General in Council to transmit, for such notice as the Society may deem it to merit, the accompanying copy of a report by Lieutenant Dalton, of the traffic carried on with the tribes of Meris and Abors, and some information of a tribe of hill people called Ankas or Jamaee.

F. CURRIE,

Secretary to the Government of India.



Read the following letters relative to a Gold Medal of H. I. M. the Emperor of Russia, presented by him to the Society which was on the table:

TO THE RIGHT HON'BLE SIR HENRY HARDINGE, G. C. B.

&c. &c. &c.

SIR,—I have the honor to transmit to you, with a request that you will have the goodness to direct them to be safely delivered, a letter and a box containing a gold medal which have been addressed to the Asiatic Society of Bengal, by command of the Emperor of Russia.

have the honor to be, Sir,
Your most obdt. Servant,
(Signed,)
RIPON.

India House, March 29, 1845.

A la Société Asiatique du Bengale.

J'ai eu l'honneur de porter à la connaissance de Sa'Majesté Impériale l'hommage fait par la Société Asiatique du Bengale de ses principales publications concernant les litteratures Arabe, Sanscrite et Tibétaine.

L'Empereur mon auguste Maitre, ayant daigné agréer avec bonté l'offre de l'association savante, m'a ordonné de lui transmettre l'expression de sa haute bienveillance; en temoignage de laquelle Sa Majesté a daigné conférer a la Sociéte Asiatique du Bengale une grande medaille en ôr à l'effigie de Sa Majesté.

Je viens de recevoir par l'entremise de la maison de commerce du Baron Stieglitz, une caisse contenant un seul exemplaire des publications sus mentionnees et je m'empresse de m'acquitter de l'ordre Supréme, en transmettant ci-joint a la Société Asiatique du Bengale, la medaille en ôr, que Sa Majesté a bien vonlu lui accorder.

En joignant a cette office un exemplaire des principaux ouvrages, portés sur la liste ci-apres, du domaine de la littérature orientale, qui out paru en Russie, je me félicite d'avoir été l'orgâne des rapports littéraires entre la Société Asiatique du Bengale et l'Empire de Russie.

(Signed,)

OUVAROFF,

Le Ministre de l'instruction publique.

St. Petersbourg, ce 25 October, 1844, 7th Novembre.

Liste des ouvrages destinés a la Société Asiatique du Bengale.

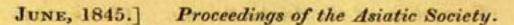
 Der Weise und der Thor. Aus dem Tibetischen übersetzt und mit dem Originaltexte herausgegeben von T. J. Schmidt, St. Petersburg, 1843, 1 vol.

- 2. Die Thaten Bogda Gasser Chan's, des Vertilgers der Wurzel der zehn Übel in den zehn Gegenden. Ans dem Mongolischen übersetzt von T. J. Schmidt, St. Petersburg, 1839, 1 vol.
  - 3. Idem. Traduction russe.
  - 4. Tibetisches Deutsches Wörterbuch von T. J. Schmidt, St. Petersburg, 1841, 1 vol.
- 5. Dictionnaire Mongol Allemand-russe, public par T. J. Schmidt, St. Petersburg, 1835, 1 vol.

- 6. Grammatik der mongolischen Sprache, verfasst von T. J. Schmidt, St. Petersburg, 1831, 1 vol.
- 7. Grammatik der tibetischen Sprache, verfasst von T. J. Schmidt, St. Petersburg, 1839, 1 vol.
- 8. Ch. M. Fraehnii Recensio numorum Muhamedanorum Academiæ Imp. scient. Petropolitanæ; inter prima Academiæ Imp. sæcularia edita. Petropoli, 1826, 1 vol.
- Die Münzen der Chane tom Ulus Dschutschi's order von der goldenen Horde, von Ch. M. von Fraehn, St. Petersburg, 1832, 1 vol.
- Ibn Feszlan's und anderer Araber Berichte über die Russen älterer Zeit, von C.
   M. Fraehn, St. Petersburg, 1823, 1 vol.
- 11. Monographie des monnaies armeniennes, par M. Brosset, St. Petersburg, 1839, 1 vol.
- 12. Déscription géographique de la Géorgie, par le Tsarevitch Wakhought, publiée d'après l'original autographe par M. Brosset, St. Petersburg, 1842, 1 vol.
- 13. Catalogue de la bibliothèque d'Edchmiadzin, publiée par M. Brosset, St. Petersburg, 1840, 1 vol.
- 14. Sammlungen historischer Nachrichten über die Mongolischen Völkerschaften durch. P. S. Pallas, St. Petersburg, 1776, 2 vols.
- 15. Dictionnaire géorgien russe français, composé par David Tchoubinof, St. Petersburg, 1840, 1 vol.
- 16. Archiv für Asiatische Litteratur, Geschichte und Sprachkunde, verfasst von Julius von Klaproth, St. Petersburg, 1810, 1 vol.
  - 17. Chrestomathie mongole, publieé par T. Kovaleffsky, Casan, 1836, 2 vols.
  - 18. Chrestomathie mongole, publicé par A. Popoff, Casan, 1836, 1 vol.
  - 19. Chrestomathie persane, publicé par A. Boldyreff, Moscou, 1833, 2 vols.
- 20. Grammaire de la langue turco-tatare, publicé par le Prof. Kasim. Bek. Casan, 1839, 1 vol.
  - 21. Dictionnaire arménien russe, publicé par A. Houdobacheff, Moscou, 1838, 2 vols.
- Asseb. O. Seyar on sept planètes ; Histoire des Chans de la Crimée ; Ouvrage de Seid Muhammed Risa, Casan, 1832, 1 vol.
- 23. Recueil de maximes, priéres, fables, etc, traduites en langue mongole, Casan, 1841, 1 vol.
  - 24. Arithmétique en langue mongole, publiée par A. Popoff, Casan, 1837, 1 vol.
  - 25. Grammaire chinoise, composée par le pére Hyacynthe, St. Petersburg, 1838, 1 vol.
  - 26. Ghata Karparam, par P. Petroff, Casan, 1844.
- 27. San. Tsi. Tsin, traduit du Chinois par le pére Hyacynthe, St. Petersburg, 1829, 1 vol.

(Signed,) K. Komoskey, Directeur de le Chamberie du Ministre.

The Secretary was requested to convey to the Russian Minister of Public Instruction, and to request him to express to His Imperial Master, the expression of the Society's most respectful thanks for the high honour conferred on it; as also for the very valuable additions to the library comprised in H. I. M. donation.



Read the following letter from Major Leech, C. B. Acting Secretary to the Governor General, N. W. P.

H. Tornens, Esq. V. P. and Secretary, Asiatic Society.

My DEAR SIR,—With reference to my letter to your address of the 14th of February last, and to your reply of the 2d of last March, erroneously addressed to Mr. Cust, I have now the pleasure to transmit to you the commencement (10 times as much will follow) of the manuscript Sanscrit to accompany the Maps of the Kuruk Ghetr which I dispatched by banghy dawk on the 26th ultimo.

I am much flattered to find that my undertaking is highly interesting to the Society, and was also so last cold weather by the great interest the Lieutenant-Governor of Agra did me the honor to express in the same.

Wherever I have been stationed I have felt that I owed it as a duty to the literary public, as well as to Government, to enquire as much as my leisure moments would permit, into the language, religious customs, and ancient history of the people I have been placed among.

Judging from the interest felt in my undertaking in this neighbourhood where the people are familiarized with the scene, I am led to believe that there is not a Native (Hindoo) Court or seat of learning, or possessors of a copy of the Mahabharut in India, at which and to whom a copy of the maps at least would not be a most valuable and highly prized acquisition, while to your learned correspondents in Europe you flatter me by saying it would not be wholly unacceptable.

I anticipate its being said by a few, and I hope a very few, that the publication of such documents is a prostitution of the press, an offering to Hindoo Idols. But by far the greater numbers will regard it in its true light, as an illustration of the Ancient Geography of one of the most classic spots in India, tending to create or increase a taste for printing and lithographing among the Natives. And perchance, by making the district of Ughul the more frequent resort of men of rank, tend to a prosperity to which it has for so many years before lapsing to the British Government been a stranger.

I am indebted to my friend Captain Abbott, who succeeded me in charge of the district of Uglhul, for the loan of surveying instruments, and of his valuable map of the district, and to the Rajahs of Pateala and Jheend, and the Surdurnea of Thanesur for their ready permission to survey such part of their territories as came within the Kuruk Ghetr.

You will perceive in this instance, as in others that have come under the notice of the Society (Journals of Natives employed by me in travelling across the Indus published by them) that I have not, as is too often the fashion, robbed the real though humble labourer of his hire, but have made the Pundit of the small Ambalah School, Jwaharlal, enter his name as the compiler of the present manuscript. I have made him again enter the name of Dander, from whose Mahatma he has condensed most of his Urdu.

Labour I have had none. Expense I have incurred little, perhaps not more than 200 rupees. I was alone fortunate in the undertaking suggesting itself to me.

I have in preparation a Persian map and a Persian Mahatma, comprising the local legends, undertaken at the request of most of the chiefs with whom I am acquainted in these parts.

I cannot here refrain from calling attention to a little mistake or two made by the immaculate authority as to the history and country of the Seikhs, who writes in the Calcutta

Review, page 156, (the Seikhs and their country.) "The word Kora-Chetre denotes the field of Kora, the opponent of the Pandus."

"With Thanesur nearly as the centre of the country around in a radius of twenty miles is holy ground, and every ghat on the Saraswati, and nearly every tank within that area is a Teeruth, a place of pilgrimage."

The words "opponent and centre" are of course the trifling mistakes I allude to.

Should there be a difficulty in lithographing the Teeruths in red letters it will not signify their being black with the rest.

By this day's banghy dawk I have despatched a drawing of a Prathanea found at Bhyn Jahsh some years back, which ought to be reduced to quarter its present size to bear binding in the account of that Teeruth.

I have to apologize for the execution of the map. Having had no time myself to devote to it. I have been obliged to entrust it to a very indifferent Native draughtsman, but still the best procurable, of its correctness notwithstanding I am well satisfied.

The border of the map which is very incorrectly drawn being taken from the Prathanea is suitably antique.

I shall be happy to publish the map and account myself on ascertaining the probable expense through your kind assistance, should the Society, from the fact of their not being in English, consider them unadapted to the Journal or the Researches, or I shall be happy to see them put into any other shape or language under the auspicies of the Society by any one having the necessary leisure which I have not.

Your's very truly, (Signed,)

Ambalah, 3d June, 1845.

## Read the following letter from the Archæological Society :-

The Secretary of the Asiatic Society, Calcutta.

SIR,—I am directed by the President and Council of the Society of Antiquaries of London, to forward to you the following publications, for the use of the Asiatic Society, Calcutta, viz.

Archæologia, Vol. XXX.
Index to ditto, from Vol. XVI. to Vol. XXX.
Somerset Place, 29th Nov. 1844.

NICH. CARLISLE, Secretary.

## Read the following letter:-

To H. Torrens, Esq. Vice President and Secretary, Asiatic Society.

Sir,—I have the pleasure to forward the accompanying (7) seven volumes, being the only works in Sanskrit in the Calcutta School Book Society's Depository. I regret that our stores should furnish so meagre a supply, but works in the Sanskrit language are so little called for that the Society have not considered it worth while to enlarge their selection at present.

The amount of the books is 8 Rs. 9 an.; which you can either pay now, or allow to stand over to some future time, as most convenient to yourself.

C. S. B. S. Library, May 23, 1845,

J. SYKES, Sec. C. S. B. S.



Resolved that, pending Messrs. König's final orders the bills be allowed to stand over, as kindly offered by the School Book Society.

Read a letter to the Sub-Secretary from the Rev. J. J. Moore, Secy. Agra School Society, acknowledging the receipt of the copy of the Rekha Ganita made here for him\* (See proceedings April, 1844) and inclosing a draft for the amount:—

Read a memorandum from the Sub-Secretary noticing that Dr. Campbell, of Darjeeling, had obliged the Society with 44 old numbers of the Journal.

Read the following note relative to the model of the Gun "Zubber-jung:"-

My Dear Sir,—Some time ago a model of the celebrated "Zubberjung" Gun, which was burst on the return of the army from Afghanistan, was sent to the museum of the Asiatic Society by mistake. It should have been forwarded to Mr. Curnin of the Mint, and since I have been apprized of the error, will you kindly do me the favor to make it over to the bearer, and I will agreeably to Colonel Stacy's instructions, send it on to Mr. Curnin.

Believe me, your's sincerely,

Ballygunge, May 21st, 1845.

ROBT. WROUGHTON.

And the Secretary stated that in returning the model he has requested Major Wroughton to oblige the Society with a cast also, on paying for the expense, which he had kindly promised to procure for it.

Read the following letter from Captain Russell, H. C. Steamer Ganges relative to the presentation to which it alludes:—

HENRY TORRENS, Esq., Secretary to the Asiatic Society.

Dear Sir,—On my last trip in the H. C. Steamer Ganges to the Nicobar Islands, I found a curious custom existing amongst the Natives of preserving the bones of their chiefs or principal persons. At Lalone, a village in the N. E. side of the island of Theresa, at the place where the brig or schooner Mary was cut off in either May, June, or July, 1844, Captain Ventura and his crew were all murdered, and the vessel burnt, part of her rigging and stores were found in the houses, the natives having fled to the jungles. Close to this village under a tree were several, say 15 or 16, of the bones of these persons dressed up as you will find by the specimen, which Captain Patterson has the kindness to take up to you from me, which I request you will present to the Asiatic Society.

On enquiry I find that from three to four months after being buried, the bones are carefully taken up, and dried, afterwards at their feasts carried about to every house by the young girls, and then placed under a tree with cocoanuts, yams, &c. laid near them. Trusting this may be deemed acceptable to your Society.

J. Russell.

Moulmain, 14th May, 1845.

Commander H. C. Steamer " Ganges."

<sup>\*</sup> But we have not been able to obtain one with the diagrams. We should be obliged to any friend who could indicate to us where a copy exists with the diagrams.—Eps.

Read the following letter in Persian accompanying the work to which it alludes :-

غريب پرور عالميان وقدردان عالمان ولى الذعمت دام اقباله

ميرساند بعد عرض

که روزی بتقریبی فیمابین فدوی و مولوي مظهر علی صاحب مذاکر8 صلحبان عاليشان امثال اكستس بروك صاحب وغيرهم كة اخيار زمان وصحف مجبول ومخلوق بنفع رساني و قدرداني ورتبه شناسي هر اشخاص علي حسب حال بودند بميان آمدة برفقدان همچنان رئيسان وحكام ذي شان تاسف وقلق ها بودلا اندر ينصورت نياز كيش بذكر اوصاف جزيله و اخلاق جميله وصفات كريمة أن ولى الذعمت كه اوتعالى وتقدس شانة عظا فوصودة است يرداخته تلخى قلق ايشان را بشيرينى سرور موفور وحبور نامحصور مبدل ساخت وصعرك تصنيف اين رساله بذام نامي جذاب خدايكاني كشت وازجذاب احديت مستدعى بودم كة عندالملازمت باسعادت مولويصاحب مسبوق بالمدح بوفور عذايات واخلاق آنوالا جاهي چذانكه بدان كرده ام بهره مدد شوند تا بروقوع خلاف بيان خجالت نبرم الحمدللة ثم الحمد لله ثم الحمدللة كه ايشان از قدر داني ومردم شناسى خدايگانى خيلى مسرور ومشغوف گشتند حتى كه اگر بالفرض درین شهر با بی علاقگی تامدت دراز طرح اقامت اندازند و گاه گاه بشرف ملازمت کیمیا خاصیت آن والا جاهی بهری اندوز شوند اصلا وهر گز لب را بشكايت زمانه كشنا نسازند و چون نياز مند بيجا كوري امور متعلقه خود را گو کسی داند یا نداند دهنده و روزي میداند بر خود من قبیل واجبات می انكارد لهذا بعد عرصة دراز اتفاق تقبيل عتبه سنيه ميشود فاما درصورت ارادة استحصال اين سعادت يعنى ملازمت جذابعالى كار روز آينده از پيشتر بمقداری که مساوی کار هر روزه باشد انجام نموده برای سلام آن ولی النعمت حاضر ميشوم باقي عراتب عرض كردني محول حامل اين عريضة است زيادة حد ادب

> يكم مالا اپريل سنة معماع فدوي عبدالوهاب مدوسل بندكان عالى



### June, 1842.] Proceedings of the Asiatic Society.

The Secretary was desired to write to the author, expressing in the name of the Society its high approbation of the work, and especially as regards the introduction of the Copernican system into it.

REPORT OF THE CURATOR MUSEUM OF ECONOMIC GEOLOGY, AND GEOLOGICAL AND MINERALOGICAL DEPARTMENTS, FOR THE MONTH OF MAY.

#### Geological and Mineralogical.

Lieutenant Sherwill, whose beautiful Geological map and collection of specimens of Zillah Behar was brought before the Society in January has at my request, added to it—I may say he has doubled its value—by giving us first a note of the heights of forty-two points measured or estimated, and then a general geological memorandum of the district. He has further, and this is not mere ornament, added to the map a set of vignettes most capitally executed, and admirably chosen to convey a faithful idea of that district.

From the whole we shall, I doubt not, be able to give as good a preliminary geological idea of the district as can be desired, or indeed expected, for nothing short of a geological survey can of course produce a correct one.

We have also received Captain Phayre's sketch map to accompany the series of specimens from Sandoway to the top of the Yoma mountains exhibited at the last meeting. The map had been left on board the H. C. S. Amherst.

Lieutenant Strover has forwarded to us, at the request of Captain Abbott, some specimens illustrative of his paper on the occurrence of granite in the bed of the Nerbudda. Lieutenant Strover says,

My DEAR SIR,—In a letter I received from Captain Abbott, he mentions that some specimens of trap blended with granite found in the bed of the Nerbudda here would be acceptable to the Society. I therefore, without delay, despatch them by Banghy Dawk franked by the political officer here; I have sent five different packets, viz., 1st the trap, 2nd granite, 3rd the granite and trap where the former preponderates, 4th where the latter is in excess, 5th indistinct blending of the two. Should the society require other specimens or layer, I shall be happy to meet with their wishes.

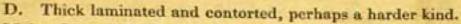
#### Museum of Economic Geology.

We have received from Captain Ousely a good supply of the Agalmatolite which as mentioned in my last report, we had recognised Major Williams' Samy stone to be; and some of it really proves to be a very fine variety, almost approaching the Pagodite.

A box of 8 or 10 lbs. weight has been sent, in the name of the Society, to Major Williams' brother, with a request that he would inform us of the success of it as a polishing material, for which, and as an anti-attrition one also, it seems admirably adapted.

I shall also endeavour to have trials made of it soon; the different varieties we have received, I have distinguished as follows in our collection and to Mr. Williams:

- A. Large block, light greenish-white fracture, talcky in some parts; the weathered surface yellowish.
- B. Sawn piece; whitish, slaty grey where cut; on the fractured surface green, grain finer and even.
  - C. Thinly laminated, and contorted. Impure between the laminations.



Major General Cullen has forwarded to us from Trevandrum two specimens of Graphite. This graphite is of the soft, loose scaly kind which would evidently not serve for pencils, and for inferior uses it is probably too cheap at home to render it worth shipping. Nevertheless a few maunds might be tried since its collection and package would be made at a trifling expense.

General Cullen says—for though not writing for publication I cannot do better than borrow his words:

Cochin, 3rd March, 1845.

"I send you by a vessel bound for Calcutta some specimens of what I suppose to be Graphite which I lately discovered near Trevandrum in Travancore. You may perhaps have observed in a late No. (30) of the Madras Journal of Science a slight notice of the discovery by me of this mineral in Tinnevelly as well as Travancore? At first the indications of it were trifling, consisting merely of small scales or sometimes of thin plates about the size of a dollar disseminated in the Limestone or Gneiss of Tinnevelly or the Gneiss or Laterite of Travancore. Subsequent researches have proved to me that it is not only very generally (widely) distributed, but that it is not improbable it may be found in such abundance and purity as to render it an article of commerce.

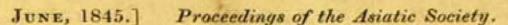
I have procured some specimens of very fine sorts, in lumps about the size of a small egg, from pits in a Kunkur deposit at Tinnevelly, but I have not yet been able to visit and examine the spot carefully. The lumps, however, seem to consist of scales or lamina rather closely aggregated, but not so much so as to admit of leads being cut out of them fit for pencils, it is also exceedingly flexible or soft.

Perhaps, however, at a great depth or incumbent pressure its solidity may be greater. Small scales or plates of graphite are also exceedingly common in Travancore, partiticularly south of Trevandrum, but I have found traces of it as far north even as Cochin.

The variety of graphite which I have sent you by sea was discovered in my search for finer specimens of the laminar kind. I learnt that the potters of Trevandrum occasionally, at the great festivals, blackened their earthen vessels with a mineral which was supposed to be plumbago.

I visited the spot, which was 5 or 6 miles from Trevandum, on the slope of a gneiss hill, the lower portions of which were overlaid with laterite; or rather the gneiss rock was there decomposed into laterite, to a certain depth from the surface; small lumps of laterite containing the plumbago were lying about on the surface, there was no regular workings, but I opened the soil or laterite in the bed of a water course for a distance of about 40 or 50 feet, and found a regular stratum or vein of the mineral more or less rich; imbedded and lying parallel to the strata of laterite as the specimens now sent. It appeared to become rich as we went deeper. I brought away some hundred pounds of the mixed ore or laterite. It has not yet been turned to any account.

Its fibrous appearance only excepted, or rather its granular texture and its application to pottery, made me suppose at first that it might be an ore of antimony, nor does it soil so strongly as the laminar varieties. The fibrous varieties are very like specimens which I have of the Ceylon graphite; the geological relation to the deposit in Ceylon will be interesting.





You are aware probably of the singular carbonaceous deposits in the south of Travaucore, have these a connection with the occurrence of the Graphite? probably not. These carbonaceous or lignite beds are chiefly immediately on the coast between Quilon and Trevandrum, but they are found also 30 miles south of Trevandrum, and also in Malabar near Calicut, as noticed by Captain Newbold."

Col. Ousely has forwarded through Mr. Secretary Halliday a fine set of specimens of the Galena of Hisato, which will be I hope more fully reported on at our next meeting.

## JOURNAL

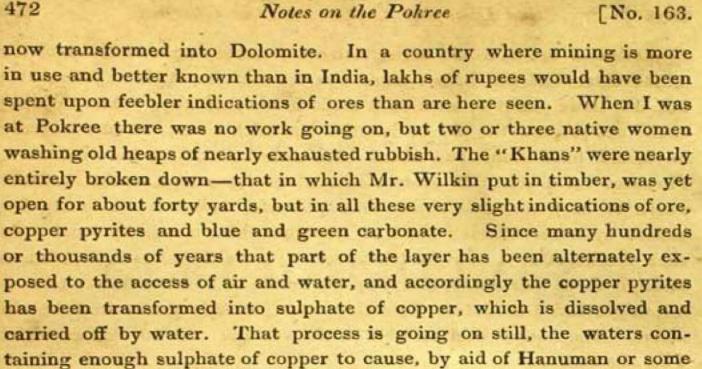
OF THE

# ASIATIC SOCIETY.

Notes on the Pokree and Dhanpoor Copper Mines in Gherwal. SIEGMUND RECKENDORF, Esq , Mining Engineer.

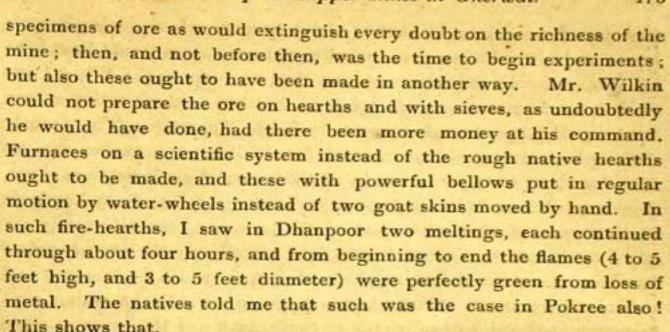
After the commissioner, Mr. Lushington's report, Vol. XII. Journ. As. Soc. 1843, little remains to be said about the situation of these mines. Pokree is on the right, Dhanpoor on the left side of the Douliganga, both about six miles horizontal distance from the river, and twelve miles between themselves. From Pokree I saw Dhanpoor distinctly, and it appeared about 1,000 to 1,500 feet higher situated. Putting the compass in h. 17 or hs. (15° E. to S. or 15° W. to N.) I had on the bearing-therefore in one line-on one side the Rajah's mine, and (according to the statement of the people,) several places where the same talcose slate occurs as in the Pokree mine. On the other side, I had a place, called Deehoor, on the road to the valley of the Gunga; and on the Dhanpoor side a place little below the village, both places containing the slate. The layer of talcose slate containing the copper ore is therefore a very extensive one, and there is every reason to believe, that the copper goes as far as the slate, and the slate as far as the formation, to which I consider the slate to belong. Indeed it requires very little attention from an eye, practised in researches after minerals, to see that the whole of the known copper mines from the Nepal terace in the east, till beyond the Pokree mine in the west, are only parts of one layer of not very great thickness, which perhaps may have been subdivided in two or three thinner layers, by some other oreless layers of slate or limestone 3 T

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other old gentleman, the great wonder of metamorphizing-i. e. covering -iron nails, thrown into the water with copper. The natives showed

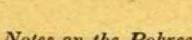
me two of these nails as perfect miracles. It was in this part of the layer where not only the native rulers worked, but also Mr. Wilkin. The slate in it is soft like soap, and very little ore remained, partly as pyrites, partly in sulphate, partly as blue or green carbonate of copper. From Mr. Wilkin's bad success no conclusions ought to be made, or can be made. An experiment on ore from Chili or Kamtschatka would be as decisive for the riches of Pokree mine as Mr. Wilkin's was, and when I heard that a "sahablok" worked 21 years at Pokree I could scarcely believe it. But I admired Mr. Wilkin's proceedings, when I saw, from Mr. Lushington's report, the means Mr. Wilkin had at his disposal, and the object of his labour. I then acquitted Mr. Wilkin of every fault of which I had accused him in my mind when I saw that, with a sum scarcely sufficient to open the spot where the ore can be hoped for and collect materials for buildings, he had to decide upon the riches of a mine at first to be created. The layer dips in h. 23 (15° N. to E.). The work to be commenced was, a gallery 30 or 40 fathoms below the old mines; and not the excavation of ores which are a very good addition in smelting better ones, but the smelting of which never would pay. If left to his own judgment, and having the whole sum at disposition, Mr. Wilkin probably would not have produced any ore in the first year and a half, at the end of which he would most probably have been able to show such



- 1. The necessary preparations before the smelting could not be made.
- 2. That the smelting was not properly conducted, the loss being too great.\*
- 3. That the ore used was not the ore which would be the object of mining on a large scale, it being impoverished by the slow metamorphosis of pyrites into sulphate of copper.

It must be confessed, that the Pokree mines are highly wronged by the conclusions made from results shown by any work done till now. It could be objected against p. 3, that the presence of better ore or richer ore, is only a supposition; but it is not so! I found in the Pokree bungalow a piece of hard rock talcose slate—with a high coloured pyrites of copper, taken from the end of Mr. Wilkin's 'Khan." The ore was from a place where either no water came, or where it stood constantly; but all the pyrites from the first 30 or 40 yards had—so said the natives—a greyish-watery colour. This shows that ore in the bowels of the mountain is better preserved than on, or near the outside; consequently more ore must be there, for it cannot be supposed that an ore which for so many miles continues, and has so little thickness, should not go, with the layer in which it occurs, to a considerable depth at least. Analogy with thousands of cases leads to the supposi-

<sup>\*</sup> In a high furnace a large quantity of metal offers a nearly as little surface to the wind as a small one. In a high furnace the ore is only exposed to the stream of wind at the moment of melting, but in a hearth both ore and metal are constantly exposed.

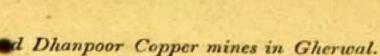


tion mentioned, that in Pokree and its neighbourhood vast quantities of copper could, with advantage, be produced. And upon observation of analogies and anomalies in nature, hundreds of valuable rules are founded, and most of sciences based.

Assisted by these rules mining is no lottery, and not more hazardous than agriculture and manufactures.

I come now to other objections made to these mines, -1. The distance from Pokree to Almorah is perhaps one day's march farther than Almorah from the plains, to a point where several days' land-carriage for the metal from the river is required. Sreenugur is yet nearer than Almorah, and even Hurdwar can easily be reached from Sreenugur, by little flat boats steered by one man, loaded with a sufficient quantity of metal. The boats should be of a light construction, and would as wood only sell very well .- 2. Articles of bulk are, for the beginning, not required, and should mining become modern in the Himmalayas, roads (which however in these parts are not so very bad, as not to be passable, after very little repair, by mules, horses, and even by elephants,) will soon be made; and in a later period larger articles certainly will be manufactured in the hills. Iron ore is plentiful there.

3.—The English copper is cheaper, because it is worse than the native copper. The natives in Sreenugur, Teeree, Hurdwar, etc., told me, they would not use the English wrought copper, but for the great size of the plates. For smaller work they prefer Dhanpoor copper. If the lessee had any difficulty in selling the metal at two rupees, he could easily give it cheaper; but his stores are always so small, that he is sure to sell even at the higher price. From cross-examination of his mookteear, and the miners and smelters, I calculated his profits at thirty per cent., and from the unwillingness of the first to tell me more, I had reason to think that my calculation was right. I told him so, and the result of my reckoning, and how I obtained the data without the reporter's knowing it. When I had left Dhanpoor, my servant told me that the mookteear abused the work people for their betraying him, and the people were quite astonished to hear they had done so. The Commissioner, Mr. Lushington, states the way in which the charcoal burners are going on. They will cease to do this if they hear that from the trees themselves better charcoal can be obtained than from the mere branches, and should they continue the work, nothing remains for the lessee but to send



his own coal-burners for working up such wood as remained from the other burners, saving thus the outlay for cutting down the trees. The lessee would have always charcoal enough, even for a large establishment, or several of them, for if the inhabitants see they can obtain a constant livelihood they will take care not to waste wood. Provision however for the renewal of the forest must always be made for the sake of future cheapness. I think too labor could be obtained cheaper than in England, even if the greater skill and bodily strength and good-will of European workmen is taken in account. The old smelter in Dhanpoor may be compared with the most skilful smelters any where. I believe now to have shown the possibility (and probability) of turning to advantage the riches of Pokree; the copper could support the concurrence of the English copper in the lower hills and part of the plains, and would have advantages over it, in the higher interior, and in such places at the foot of the hills where the English product cannot reach by mere water carriage.

The Dhanpoor mines, or holes, are worked to advantage, and no doubt could be made more so; but perhaps it would take more trouble to find the layer of copper than in Pokree. What till now is opened would under European superintendence be entirely exhausted in the course of one year or two. It is possible the layer may turn out to be a regular dyke, but I suppose it will not be so, but might be cut off by slate at no very great depth. The working on a large scale would be also more expensive in Dhanpoor than in Pokree, for the ore must be stamped, and washed on moving hearths. However, I will not say, that Dhanpoor mine could not be made, by continued labor, a very rich one. The situation of Dobri mine on the other side of the very same hill range, admits no doubt of the ore's extension; moreover the steepness of Dhanpoor hill admits shorter galleries and to greater depth. The present mine could not of course be of any use. There are galleries of several fathoms in height and breadth, following upon and preceded by others, which are so low and narrwo, as to admit only children; and the slope goes downwards, then up again for a few yards, now to the right, then to the left; &c. A shaft in the mine is only passable for those who do not mind going about in the dress of Adam on the first day of creation, for only the adhesion of the skin to the nearly CENTRAL LIBRARY

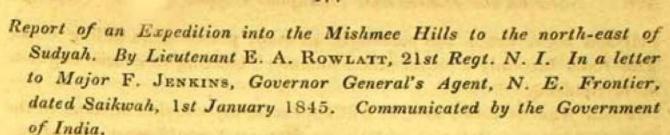
polished rock, keeps the passenger in many places from falling down. The tools are only a chisel and a hammer; blasting of course ought to be introduced.

From what is above said, it will appear as my conviction, that in the copper mines of Pokree and Dhanpoor, capital could most advantageously be employed. But it is not Government, in my opinion, who should The best writers on national economy agree, that such work there. speculations do not thrive in the hands of a Government. If Government would give these mines to any private individual or company, for as long a period as they pay regularly a certain duty from the produce, and would allow to any one else to begin mining wherever he could find an ore, in a very short time, certainly, many places where ore is known, would be taken up, and the revenues of Government, now derived from the mines, would be very considerably increased. Districts, now nearly empty of population, void of cultivation, useless to the treasury, would yield revenue, and the population would become acquainted not alone with European luxury, but with European skill and intelligence, which would be at first more useful than schools and missionary establishments. As the agriculturist prepares by ploughing the hard soil for the reception of the seed, so we may consider, the becoming acquainted with the advanced state of European arts would " plough" the Paharri's mind for the acceptance of higher objects, which they might be thought fit for being taught in some future time.

And did not nature show her intention of civilizing the inhabitants of these wild districts through mining, by her upheaving such mineral riches which, in their present state of civilization, they cannot appreciate?

With regard to the capital required for the opening of Pokree mine and Dhanpoor mine, I think 40 to 50,000 rupees would be more than sufficient for both establishments, on a footing equal to the advantages which can be expected in the first result of an operation, which may be carried on through hundreds of years.

Calculta, September, 1845.



I now do myself the pleasure of forwarding to you an account of the expedition from which I have just returned, and at the same time beg to submit a map of the country through which I passed, to this I have added some portion of the country more to the north than to where I penetrated, and which is therefore merely laid down from descriptions gathered from the Mishmees who have visited those parts.

On Thursday, the 21st of November last, I quitted the port of Saik-wah by water, and on the following day being joined by two Sudyah Beekhyahs, Deena Hazaree and Baleah Boca, who were to accompany me during the trip. At the mouth of the Koondil river, where I had remained the night, we took our final departure, myself in a small khail boat, and the rest of my party in the small fishing boats of the country, which, for the sake of ascending the rapids of the Burhampooter, are made particularly light and handy.

As it was our first day, we were not able to start very early; and I found that the evening was drawing to a close before we had long passed the mouth of the Tainga-panee. Up to this point the stream continues pretty tranquil, although a perceptible difference is observable in the rate at which it flows; and as from this point upwards the banks and islands are almost entirely formed of stones\* washed down from the mountains, the water from hence is most beautifully clear and transparent.

Nov. 23rd.—In pursuance with the directions I had given the previous evening, the boats moved off by sunrise, and by 9 A.M. we reached the Khamptee village of the Kaptan Gohain at Choonpoora, where I stopped for a short time, and again moving forward, arrived by the evening within a short distance of the mouth of the Dhollee river, which I got to early the next morning. Being anxious to see a copper Tem-

<sup>\*</sup> These pebbles and boulders are all of limestone, and furnish all the lime used in the public works in Upper Assam. The limestone is a grey crystalirized rock just exactly the same as the marble used as flags in the Government House. I have never seen it in sitû.—F. J.



ple that is situated on a branch of this stream called the Sutrung, I ascended the river in the smaller boats, and finding that the water in the Sutrung was only a few inches deep, I was obliged to wade up this stream; but from the jungle having become excessively dense, and having no person with me who knew exactly the position of the Temple, I was obliged to give up the attempt and return to the mouth of the river, unsuccessful and disappointed.

The erection of this building is ascribed to a demi-god, named Purahoutan, who, falling in love with the goddess Khaisa Kattee, undertook at her commands to build her a temple in the space of one night, which if he succeeded in completing he was to obtain her hand in marriage, but failing in his task was to give himself up to be devoured by her. On these terms, Purahoutan commenced his undertaking, and had completed the Temple with the exception of the doors, when the sun being made to rise before its time he was obliged to fly to the woods; but, being soon after overtaken by his beloved, was then and there devoured as a morning repast.

The Temple\* is called the Tama-suree, being partly made of copper; and at so late a period as a little upwards of twenty years ago, two human beings were sacrificed yearly at her shrine to propitiate the good auspices of this sanguinary goddess. Near the mouth of the Dhollee are yet visible the remains of the residence of the Chutteeah Rajas, whose rule is said to have extended over the whole valley of Assam as far as Gowalpara, but which was terminated by the invasion of the Ahoms, who crossed the hills from Moonkong.

Nov. 25th.—As we had now fairly got into the rapids of the Burhampooter, where it was necessary for the boatmen to be constantly in the water, I stopped to cook before setting off, as the weather being cold the men did not like wading, until they had fortified themselves with some food. I managed, however, to get off by 8 o'clock, and before midday had passed the mouths of the Khairam and Degoroo rivers. The banks of the Burhampooter are here principally wooded with the

<sup>\*</sup> A remnant of the priests of this Temple, who call themselves Dolyes, have lately come to Lieut. Dalton's notice at Luckimpoor. They are of Chooteeah origin: they boast of the human sacrifices, and say the discontinuance of them has been the cause of all the misfortunes of Assam. Lieut. Dalton promises some particulars of these Chooteeahs, the last great race who held possession of the north bank of Upper Assam at an early date.—F. J.



influence over these Mishmees, I was glad to accept of their escort. I therefore left my boats, and after passing over three or four miles of pebbly beach that lines the banks of the Burhampooter (or Lohit as it is usually called by the people in this part), I reached the road which, leading through the jungle that intervenes between the river and the hills, ascended up to the village which is situated a short distance up the acclivity on a level piece of ground well adapted for such a purpose. The village of these Khamptees consists of fifteen houses, and is placed on a spot of ground that some years ago was the site occupied by the Mishmees, who then called it Maboling, and is watered by a small hill stream named the Toolooah. Their cultivation, which is rather extensive, is scattered around the village, both on the side of the hill and in the plain beneath. This position has now been occupied by these people for the last three years, and in consequence of the protection they afford to the Mishmee tribes in this quarter from the inroads of the Chullee Cuttia and Myjoo Mishmees, a great many of the more influential chiefs, amongst whom I may more particularly mention Prum Song, the head of the Muroo tribe, have settled in their neighbourhood which, being much more productive than the hills in the interior and nearer to the plains, with which they are anxious to extend their trade, they find it much to their advantage to cultivate the goodwill of these Khamptee chiefs; for, should these Khamptees remove from this place, the whole of the Mishmees who have settled in their vicinity must again flee to the sterile mountains beyond the river Tiding, and forego all the advantages of trade, which from their proximity to Assam they are at present enabled to prosecute with considerable gain to themselves. During my stay in this village I ascertained the height at which the Burhampooter issues from the hills, to be 2049 feet above the level of the sea.

By the 3rd December all arrangements having been completed, and the necessary number of people collected to carry the baggage, I left the Khamptee village, and again passing down the descent entered on the stony beds of the Burhampooter; over these we passed for some miles, and found the passage along them any thing but pleasant walking. On arriving at the mouth of the Damai river we ascended that stream, and by evening had reached the path that leads up the first range of mountains. On producing my store of beads, salt, &c., I found that half a



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rupee's worth of these articles was demanded for every day's work, and as I could not have proceeded without the assistance of the Mishmees, I was obliged to agree to their very exorbitant demands.

On the morning of the 4th, after a hasty meal had been despatched, and the several loads adjusted, we quitted the spot we had occupied during the night, and for some time ascended and descended the small hills that line the banks of the Damai. After an hour or two we arrived at the foot of the large range that bounds the view from the plains; the ascent was rather abrupt, and the path but a bare track up the face of the mountain. By midday we reached a small level piece of ground, where a little water was procurable; and as the mountain air seemed to sharpen our appetites, a few eatables that we had with us were devoured with great gusto.

By 4 P.M. we reached the summit, from which a splendid view of the plains and the surrounding hills is visible: on the right are seen the towering mass of immense mountains that form the country of the Myjoo Mishmees; and in the plain beneath, the prospect is only bounded by the far distant horizon, within whose limits the endless sea of forest that characterises this part of Assam is the only object that meets the eye. From this point we again descended for a couple of hours, and as the evening was drawing to a close, arrived at a small hill rivulet where, as water is the principal requisite to be sought for in a place for encamping. I determined to spend the night, although nothing but the stony bed of the stream was available to rest on. The weather being cold we found our night's repose rather uncomfortable, and were glad when the morning broke to arise and set about procuring some breakfast: this being soon accomplished we again set out, but found the road worse than the previous day, as it led over numerous landslips that in this part are met with on every slope; part was therefore over broken ground, and every now and then we had to pass onward by means of single trees that had accidentally fallen across the chasms that intersected the path. As the greater part of this day's march was descending the mountain we had ascended the day before, and the road improving as we advanced, by 12 o'clock we entered on the scattered cultivation of Saloomgoom, from which the Burhampooter is distinctly visible winding its tortuous way around the foot of the hills beneath. As we approached the village, here and there the houses of the Mishmees became apparent, and as



it is the custom of these people to build separately on the land they cultivate, a village is spread over a large space, although confined to a few habitations. On reaching the house of the Gam Abasong, I found that the whole of his people were employed in making preparations for the reception of myself and party, and doing all they could to make us welcome.

By 10 a.m. of the 6th we left this village, and there being a scarcity of people to carry the baggage, I here deposited every thing that it was possible to dispense with: after passing some cultivation the road led down by a steep descent to the banks of the Tiding river; some distance up this stream a large number of Mishmees, principally of the Malo and Moree clans, are located, who cannot be reckoned at less than a thousand persons. As the river was low, we crossed over by means of the fishing weirs, which extend across the stream; but the usual method adopted by the Mishmees themselves, is by fixing a hoop of cane round the waist, which, passing over a single rope of the same material stretched from bank to bank, enables them to propel themselves forward with their hands and feet, and whatever articles they may have with them are suspended to the bottom of the hoop: in a similar manner both cows and buffaloes are conveyed from bank to bank, being dragged over by other ropes attached to the hoops in which they are carried.

In the bed of this river are to be found a great variety of the different primitive rocks: lime is here met with in immense blocks, and granite, serpentine, &c. with numerous metalliferous stones, are mixed together in the greatest profusion. On leaving the bed of the Tiding, the road leads over the spurs of the mountains that continue down to the banks of the Burhampooter, and for some distance passes under the perpendicular cliffs of primitive limestone, from which are visible the pendulous stalactites that are peculiar to this formation; after passing the limits occupied by this rock the soil becomes micacious, and in a few places I observed mica slate to cross out from the surface. Arriving on the banks of the Burhampooter, the only path was from block to block, which being of great size and worn to a smooth surface from the action of the water, the passage over them was thereby rendered both arduous and difficult.

The mountains in this neighbourhood are mostly covered with dense tree jungle, of great magnitude, for about two-thirds of their height, above which is grass, and near the summits bare rock; and in the dells



between the mountains, small hill streams, of beautifully clear water, flow along the hollows until lost in the large rivers that intersect the country. By sunset we reached a Mishmee house, and were glad to avail ourselves of the shelter offered.

Dec. 7th.—As rain had continued falling during the night and the greater part of the day, I was unable to proceed further than a few miles; but contrived to reach the house of a chief, named Heasong, to whose residence most of my baggage had been taken on by mistake the previous day.

Dec. 8th .- On leaving this place, and passing through much low jungle where formerly cultivation had been very extensive, we reached the Loolooah rivulet, and crossing which the road lay skirting the banks of the Burhampooter, to the bed of which we occasionally descended; for the most part the road for these hill tracks was tolerably good, except one place that ran along the side of a low rocky mountain where the footing was unsafe and precarious, from which had any one fallen, he would have been precipitated some thousand feet into the boiling stream of the Burhampooter, the noise of whose waters was just audible from the height we were passing. During this day's march we passed by an elevated lake of small extent, as well as many streams of minor size, and by 4 P.M. arrived at the house of Rumling, who is the head chief of the Taen tribe of Mishmees, and has established himself near the Pass leading from the country to the south of the Burhampooter, which being inhabited by the Myjoo Mishmees, with whom the tribes to the north of the river are at war, affords thereby a protection against the inroads of these people. As a large pig had been slain by this chief in honor of our coming, a part of which is usually reserved for the inmates of the house, I was much amused to see the manner in which these people cook and feed themselves. The animal being killed the blood is all carefully collected, and with the grain babosa is made into a kind of black pudding; the meat is boiled in a large chaldron, and being cut up into pieces is distributed in leaves amongst those in the house; these pieces being taken up in the hand are forced as far as possible into the mouth, and the remainder cut off close to the lips: when this is disposed of, the mixture of babosa and blood is stuffed down their throats as fast as they are able to swallow it. In this manner their meals are completed in a few minutes, when they



again take to their pipes, which are seldom out of their mouths from morning to night. Many of the cooking utensils used by these people are made of stone; but they also possess some of copper, which are brought over from the Lama country; in these they boil their water, cook their victuals, and make the liquor of which they consume large quantities; but as it is drunk in an unfermented state, and therefore is of little strength, a great many quarts are necessary to produce the slightest intoxication.

As I was informed by this chief that some people of the Lama country were at a village some distance further on, I determined to proceed to the place they were remaining at, and sent forward a messenger to inform them of my intention. It was therefore the morning of the 11th December before I quitted this chief's house, and after proceeding some distance we arrived at the Dillee river, which is a stream of considerable size, having its rise in the snowy range bordering the Lama country, along whose banks a path to that country exists. After crossing this river we proceeded along the verge of the Burhampooter, and by 4 P. M. reached the mouth of the Doo river, which, although a stream of some magnitude, is yet much inferior in size to the Dillee, and rises also in the same range of mountains as that river, a little more to the eastward, and is one of the routes by which the trade with the Lama people is carried on. From this point the Burhampooter has a southeasterly direction, and, winding between the mountains, passes through the snowy range beyond which the valley of Lama is situated. By the route of the Dillee river the road leads out at the village of Glee, and by the Doo at that of Lamai in whose vicinity are also many other villages of the Lama people, all of which are described as situated on the The village highest up this river is named Lisko, Burhampooter. where the Burhampooter is said to be but a mountain rivulet, and on the west side of the same mountain from which this issues likewise proceeds the Dehong river.

Dec. 12th.—After quitting our halting place we proceeded up the bed of the Doo river, over large boulders of granite and serpentine, and where from the river passing between perpendicular scarps of rock we were unable to continue along the bed; it was found necessary to ascend the banks of the river, which, as they were very precipitous, was found to be difficult to be accomplished, and in many cases extremely dangerous to

pass. By 3 o'clock our party reached a flat piece of ground overlooking the river, where it was considered advisable to remain during the night.

The several clans in the neighbourhood of this stream consist of the Manneah, Tshee, Dhah, Tummaih, and Mlee, who altogether are a numerous people, but in appearance most indigent and ill provided both in food and clothing, and are as wild a set of unwashed savages as may perhaps be met with in any part of the world.

The water of the Doo is by no means good, having a disagreeable taste, and has the property of giving goitre to all those who drink it.

Dec. 13th .- On leaving the bed of this river, the ascent up the Dagoom range of mountains is very steep, and in many places where the rain had cut the side of the mountain into deep chasms, the path could only be passed by means of trees thrown from point to point, beneath which a perpendicular scarp of rock was all the resting place that would have been found had an unlucky step or a rotten bough caused any one to fall at any of these places.

On arriving at the village of Tuppang, I and my party put up at the house of the Gam, and as the Lama people were staying at a house not far distant, during the afternoon I had an interview with them. appeared they had come across the snowy range for the sake of trading with the Mishmees for teeta; \* but from the snow having fallen unexpectedly, had not been able to return to their own country.

In appearance these people much resemble the Chinese, and are dressed in a loose robe that falls in folds around the waist, and are a fair and tall race of men; some wear the hair plaited in the Chinese manner down the back, while others have the head shaved; and from their description of themselves, it appears that those who trade with the Mishmees are likewise a hill tribe, and in their manner of life differ very little from the Mishmees themselves. I should however imagine, that the country they inhabit is not very rugged, as on all the cattle brought from thence I observed the marks of the plough distinctly visible on the neckt.

<sup>\*</sup> Captis teeta, Wall.

<sup>†</sup> This agrees with a report current in Upper Assam, that during an excessive inundation of the Burhampooter, a great number of ploughs and other agricultural implements were brought down by the floods,

The Assamese suppose the country they come from to be inhabited by Kotas; of which are the Assamese themselves, as the great body of the Assamese population .-F. J.

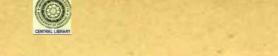


After conversing with them for some time, I found they were prohibited by their own Government from visiting the plains of Assam, and not having been to Lassa the capital, were unable to give me any precise information regarding the Tsampoo; but said that, according to all they had heard, the river flowed into the valley of Assam after quitting the country to the north of the mountains, and is therefore in all probability identical with the Dehong.

The view from this village is very grand, as the distance from the snowy range, which was immediately opposite, was only two days' journey to the summit, and from this point (Tuppang.) I was told by the Mishmees that they were able to reach the village of Lamai in the Lama country in three days.

As no further population is to be met with on this side of the snowy mountains, I determined to retrace my steps from this point, as no advantage could, I conceive, take place by my proceeding any further in this direction; I therefore on the following morning again left this village, and, varying my route so as to allow of my getting a sufficient set of sights to complete my survey, I arrived again at the Khamptee village on the 22nd of December.

From hence I set out to visit the celebrated Teeruth of the Hindoos, called the Brahma Kund, which I reached, and returned from, in two days. This place I found to be merely a bay or inlet of the Burhampooter, into which falls a small stream, that issues from the side of the hill immediately above it; this is considered the holy water in which all the devotees who visit the place bathe themselves, and is reported to have the virtue of washing out all the sins that the person may have previously committed. During the time of the Ahoms, it was necessary for the king on his ascension to the throne to be washed in water brought from this place, and until this ceremony was completed he was not considered fit to take upon himself the reins of government: to insure the benefits of absolution, it is considered necessary, that the person should ever after forego the use of some kind of food; but as this is left entirely to the person's own choice, such articles are commonly selected as are either not particularly liked by them, or such as are not often procurable. At the point where the water first shows itself, the large stone that covers the orifice as well as those on either side of the stream, were formerly gilt by a Khamptee Raja,



a portion of which gold is yet visible. The water of this streamlet is warmer than that of the Burhampooter, but is of a disagreeable taste. I was told by my guides, that the rains of 1843 considerably altered and damaged the place.

On my arrival at the Khamptee village I left by boat, and again reached the post of Laikwah, on the 30th December.

Religion.-The Mishmees seem to have but a very faint idea of any religion: they, however, worship a numerous set of Deos or gods, a great many of whom do not appear to have a name; the most to be feared amongst them, is the god of destruction, named Mujeedagrah, who in his attributes much resembles the Hindoo Sheo or Maha-déo. Sacrifices are also offered to Damipaon, who is the god of instruction and the chase; to Tibla, as the god of health and disease; and these two last named together with a god called Prepang, are supposed to wander about in company from place to place. When any disease appears in any of their houses, a priest of these people is sent for to drive away the evil spirit. This ceremony is performed in the following manner: The time fixed on for commencing is sunset, when the inmates of the house and the relatives of the person concerned are assembled within the house; and the priest having placed himself in the centre, he commences chaunting a dismal kind of dirge in a most monotonous strain. this has continued some time, the priest rises with a fan in one hand, and a box containing pebbles in the other; with these he dances about on a mat, flourishing his fan and rattling his box: after this has lasted some time, he leaves his mat and begins moving up and down the house, continually singing the same tune; and arriving at the door, he pretends to drive the spirit out of the house: this is repeated several times, after which the intended sacrifice is led forth, and after much unnecessary cruelty, is killed by the priest and offered to the supposed spirit.

These people do not appear to have any very distinct conception of a future state, but suppose that all, whether good or bad, will go to the same place as their fathers and mothers have before them; and that, if the friends and relations of the deceased offer up sufficient sacrifices in their name, they will be permitted to return again to the earth, but failing in which, the spirit of the dead becomes an avenging demon, empowered to work all sorts of evil on the heads of the relatives who have omitted to perform the necessary rites.



Burials .- On the death of any person of consequence, the body is buried, and, according to the wealth of the family, a greater or less number of animals are slain, and the heads deposited around the grave on a frame-work of wood, in the centre of which a circular house is built over the grave itself, in which is placed flesh, both raw and cooked, together with grain, spirits, &c. and all the arms, clothes, and implements necessary for a person whilst living. Should the person be poor, the body is either burnt or thrown into a river if near at hand.

Births .- When the time of a woman's confinement is near at hand, a small shed is erected for her reception in the jungle near the house, in which she remains until the time of her purification is completed. If the child proves a male, this lasts for ten days; but if a female, for only eight from the day of its birth: during this time the mother is fed from the house, and none but her female relations are allowed to visit her.

Marriages .- Marriage amongst the Mishmees is perhaps the most singular custom that prevails regarding this ceremony. Alliances are usually contracted by the parents for their sons and daughters; and on the part of the man, presents to a large amount are required to be given to the father as the price demanded for his daughter, and which are usually proportioned to the rank and beauty of the woman: these presents consist of buffaloes, cows, gongs, salt, &c. &c. with a large quantity of dried field mice and fish. The wives allowed to one man are not limited to any number, but do not often exceed four or five. When a man dies or becomes old, it is the custom of these people for the wives to be distributed amongst his sons, who take them to wife; but the mother of any of the sons is always transferred to one of her husband's sons by another wife, so that a man is not actually obliged to marry his mother, but merely his father's wife.

Dress and Arms .- The dress worn by the Mishmees consists of a cloth bound round the loins, which passes between the legs, and is fastened in front, and a coat without sleeves that reaches from the neck down to the knees; two pouches made of fur are used, in which to carry their pipe, tobacco, flint, steel, &c., and on the back is carried a flat shaped basket, which is covered with the long fibres of the Sinwa tree, and ornamented with the tail of a Lama cow; below the knee is bound a quantity of finely split cane. The dress of the women is made of exactly the same material as that of the men, and consists of a bodice which barely



serves to cover the breasts, and a skirt that reaches from the waist as far as the knee; on the head is worn a tiara of silver, and a profusion of beads are suspended around the neck.

The principal weapons used are the spear, and a straight sword of Lama manufacture, to which is occasionally added a matchlock or crossbow, from which are projected poisoned arrows. When proceeding on any expedition of danger, a strong coat of sufficient thickness to ward off the force of an arrow is added to their costume, as well as a cap of fur, or split bamboo.

In person both male and female are disgustingly dirty, and, with the exception of a few of the chiefs, are seldom washed from one year's end to another.

Manufactures.—The clothes worn by these people are for the most part made by themselves, and consist of cotton which is cultivated by them for the purpose, and a few woollen articles made from the fleece of the Lama sheep, and in appearance seem to possess great durability both as to color and material. The hills, however, beyond the first range of mountains bordering Assam not being capable of producing cotton, the people beyond these limits are therefore entirely dependent for dress on the Mishmees bordering Assam, and the Lama people on the north side of the snowy range. In all other branches of manufacture, these people seem to be very deficient, and with the exception of spear heads and a few articles of this description, are capable of producing no kind of utensils that might prove of use to them in ordinary life.

Trade.—Trade is carried on by the Mishmees almost entirely by barter, and the tribes to the north of the Burhampooter may be divided into two classes, namely, those who trade with Assam and those who trade with the Lama people; the first usually bring down to Assam, swords, spears, gongs, copper vessels, with small quantities of Mishmee teeta and poison, which they exchange for cattle, salt, and various kinds of cloth, beads, &c.; but most of these articles not being produced by themselves, they are obliged to procure them from the Mishmees who trade with Lama, and for which they give cloths made by themselves, and those they take back from Assam. The second division having nothing to offer in barter but the Mishmee teeta and poison, which is only to be found on the mountains near the limit of perpetual snow; being in great request by the people of Tibet, they are enabled to exchange it for cattle, gongs,



swords, and copper vessels: they also barter a great deal among themselves, but the difficulty of passing through the country must always in a great degree tend to hinder the advancement of trade, as from the nature of the country it can scarcely be expected that any other mode of conveyance can be adopted, than that of carrying all goods in the baskets at present in use amongst them, which are placed on the back and supported by a band which passes round the head.

Houses and mode of Living .- The habitations of the Mishmees are generally, as much as possible, hid from the view by being placed in patches of jungle left for the purpose of concealment; they are usually built apart from each other, and unlike most other people, these Mishmees never congregate in villages. Their houses are all constructed with raised platforms, and vary from 12 to 15 feet in breadth, and 120 and 180 in length: a passage down one side communicates with the rooms, which are divided off into lengths of from ten to thirty feet long; down the whole length of this passage two bamboos are placed, on which are ranged the heads of all the animals that the owner of the house has killed during his lifetime, and which being constantly exposed to the smoke from the fires, and plastered with blood on the occasion of any animal being slain, turn to a perfectly black color with a fine polish. Above the fires, one or two of which are placed in every compartment, are hung crates of bamboo, which are used for drying and smoking whatever articles are required; and about these compartments blocks of wood are strewed, which serve the inmates for pillows. The under part of the house is appropriated to the pigs and fowls, in which they are confined by a paling of wood. The staple commodity of food cultivated by these Mishmees is a grain called babosa; it is used both for food, and to prepare an unfermented liquor, which is drunk in a hot state as soon as made. Rice is grown, but in small quantities, and merely by those tribes in the vicinity of Assam, and is not capable of being cultivated on the mountains in the interior: they however possess other kinds of grain, such as buck-wheat, Indian-corn, baitnah, &c.; but should all these fail them, they are capable of existing on the interior part of the Sinwah and Dhainkeeah trees, which afford sufficient nutriment to preserve them from starving, and affords excellent food for their pigs, on which they are commonly fed.



Flesh of all kinds is in great request, and all animals, from a mouse to an elephant, are eagerly devoured by these people, merely with the exception of crows, the black ape, and muster\* found in rivers: that of the women is much more limited, being confined to fish, wild birds, and field mice; but, however fond they may be of animal food, they have not yet paid any attention to the breeding of cattle, but kill and eat whatever they may be able to purchase immediately on arrival at their villages.

Customs, Manners, &c. &c.—The domestic economy of the Mishmees does not appear to be burthened with many customs or observances such as are met with in civilized life; but, nevertheless, some of their habits appear but little adapted to a savage state, amongst which I may mention the practice of not eating flesh, or any thing but plain boiled grain in the houses of their superior relations by marriage, but which does not apply if the case is reversed, as the superior relations are not prohibited from eating whatever may be offered to them in the houses of their inferior relations; but as marriages and intermarriages are very common, it is but very seldom that a married man is capable of partaking of the rights of hospitality amongst his own or the neighbouring clans, although there may at the time be enough or even more than enough to satisfy all.

The whole of the tribes to the north of the Burhampooter as far west as the Degaroo and the source of the Tiding rivers, and to the east as far as the Doo river, may in a political sense be treated as one people, although the divisions amongst themselves into clans are numerous, among which the Taen and Maroo hold the two first places; but, being so intimately connected with the other clans both by the ties of marriage and interest, cannot be regarded as a separate people or distinct from each other in any way except in name: every clan has, however, a flominal head; but the power of their chiefs is extremely limited, and may be set at naught by any person who considers himself sufficiently powerful to assert his independence. Laws and punishments seem scarcely to exist, and with the exception of murder and abduction, no other crimes against each other appear of common occurrence; this last is, however, a fruitful source of dissension and quarrel, and when any case of the kind takes place, the person from whom the woman has been taken, demands the amount he



paid to her parents for her from the man who has taken her away, which if he gives, the affair is generally ended, as they never take back a woman who has misbehaved in this way; but should the man refuse. or be unable to pay the demand, the man who has lost his wife, lies in wait to slay the seducer, and if successful, it then becomes the duty of his relatives to avenge his death.

Agriculture appears to be conducted in the most rude and simple manner, and the use of the plough is unknown. When the time of sowing approaches, the surface of the ground is merely scratched with a small kind of hoe, which penetrates but a few inches into the earth; and domestic animals, with the exception of pigs and fowls, are not reared.

Slavery does not exist to any very great extent amongst them, and is chiefly confined to such individuals as they are enabled to purchase from other tribes, although some few instances of persons being sold of their own tribe amongst themselves are to be met with. It is, however, carried to a far greater extent by the people on the other side of the snowy range, and I am given to understand that whole villages of Assamese are in great numbers in the Lama country.

Geography .- The geographical features of this part of the Himalayah range, do not in any very essential particulars differ from those of other mountainous countries: in every direction it is intersected by small streams, which either fall into the Burhampooter or the larger tributaries to this river, the Tiding, Dillee or Doo. The height of the mountains is somewhat less than those more to the west, and with the exception of the snowy range itself, no mountains on the side of Assam are covered with perpetual snow, although during the winter months the peaks of all of them become more or less covered; but even at these heights the fir, which is usually indigenous to mountain tracks, does not exist, being entirely confined to the Lama country, and the part of these hills marked in the map as the Myjoo country.

Geology .- As the formation of these mountains is entirely confined to primitive description of rocks, it does not perhaps afford so fruitful a field of investigation into the science as may be found in other parts of the world. It nevertheless must possess some interest to the geologist, as almost every variety of these rocks is to be met with in the greatest profusion; a considerable part of the first range passed over by myself is composed of dolomite or gypsum, in which also is to be found a great



quantity of alabaster. On the left bank of the Tiding, primary limestone prevails; beyond which micaceous formations are numerous, which in the vicinity of the Toolooah river become mica slate. Serpentine abounds in the bed of the Burhampooter, and granite would appear to occupy the higher elevations of the mountains, as I did not perceive any in sitû, although boulders were plentiful in all the streams. I however beg to submit these observations with diffidence, and trust that the few specimens forwarded herewith may throw some light on this subject when submitted to more competent judges than myself.

MY DEAR SIR,-I have the pleasure to forward two heads of the animal which, in some of your communications you informed me, were supposed to belong to an animal somewhat resembling the African Gnoo.\* It however appears, from the descriptions given of it by the Mishmees, to be of the deer [antelope] kind, and is called by them Takang, and by the Khamptees, Khing. In size the animal is but a little smaller than a buffalo, having an immense chest and shoulder, but small hind quarters; the fore-legs are large and powerful, but taper off below the knee; the under part of the neck is furnished with a dewlap that reaches nearly to the ground, and is covered with long hair; the skin is speckled, and on the top of the back and neck is almost black; the tail resembles that of the deer, being only two or three inches long, and is turned up when the animal is in action. It is only to be found near the snow, and is said to be very fierce and dangerous to approach.

The fur cap that accompanies the heads is made of this animal's skin: the larger head is of a male, and the smaller of a female; but the - † of both have been as much as possible cut away to enable the hunters to bring them in. I am happy to say, that I have been promised by the Rannah Gohain's son a complete set of all the bones, together with the skin of the beast, which I hope he may shortly succeed in procuring. The other head is that of a Lama cow.;

<sup>.</sup> This animal is supposed to be as yet undescribed. I will forward the specimens by the first opportunity .- F. J.

<sup>+</sup> Illegible in MS .- Ep.

I Most of the specimens here mentioned have arrived at the Society's Museum, including a skin of the Takang, and a frontlet and horns; also the head of the " Lama cow," which would appear to be of the hybrid Yak race, termed Yho and Yho mo, was according to the sex. The Takang, however, cannot well be described until its bones or at least the entire skull, with the skin of the face and the extremities, come to hand .- Cur. As. Soc.



Soon after my return from the Mishmee hills I again left Saikwah, and proceeded by elephant up the Koondil-panee, and after passing the mouth of the Depho-panee, followed up the course of that stream, until I arrived at the foot of the hills; and as the fort I was in search of was said by my Khamptee guide to be between the Depho and Jameesa, I took a direction through the jungle about east, and without much difficulty arrived at the fort five days after quitting Saikwah.

This fort\* is said to have been built by Raja Sisopal, and is situated on an elevated plain at the foot of the hills; the extent of it is considerable, as it took me about four hours to walk along one side of its faces: the defence is double, consisting of a rampart of stiff red clay, which, as the surrounding soil appears of a different nature, must have been brought from some distance. Below this rampart is a terrace of about 20 yards in breadth, beyond which the side of the hill is perpendicularly scarped, and varies from 10 to 30 feet high; the principal entrance, and the defences for some distance on either side, are built of brick, and on many spots in the interior I observed remains of the same materials, so that in all probability the houses occupied by the inhabitants must have been built of masonry. As I was unable from scarcity of provisions to remain more than one day at this place, I could not examine it so minutely as I could have wished. It seemed however to be composed of only three sides, the steepness of the hill at its north face precluding the necessity of any other works. At present the whole of the northern part of it is thickly covered with tea, which extends, according to the Khamptees who know the locality well, in a belt of more than a mile in depth all along the foot of the hill within the fort, and not as marked in my map, which was drawn before I visited the place. More to the west between the Dihing and Dehong is a much larger fort, and, as I believe, entirely composed of brick, as well as a tank of similar construction, surrounding which are numerous hill forts of small dimensions erected by a Raja named Bhishmuk, and the popular tradition amongst the people of this part of the country is, that on the destruction of the empire of these kings by the Hindoo god Krishno, the people who

<sup>\*</sup> Of these forts we had very imperfect information before, and I believe Lieutenant R. is the first officer who ever visited them. They refer to a time of which we have no history or even tradition, further than frequent traces of the dynasty of the Pals throughout Assam.—F. J.

were able to make their escape fled to the hills, and have in the course of time become converted into the present tribes of Abors\*. Near these forts a great number of wild Methuns† are to be met with, and the whole of the country, from the mouth of Koondil to the base of the hills, presents many indications of former cultivation. On this expedition I was absent nine days.

Dibrooghur, 6th February, 1845.;

Note on a curious Sandstone formation at Sasseram, zillah Shahabad.

By Lieut. W. S. Sherwill, 66th, B. N. I. With a Plate.

At the foot of a hill at Sasseram, zillah Shahabad, which forms the termination of a spur thrown off from the Northern face of the lofty range of the Kymoor Sandstone Mountains, I observed a curious apparent horizontal columnar formation in the sandstone, as shown in Plate 1. The disposition of the sandstone at this spot has all the appearance of a quantity of horizontal columns, of several feet diameter each, and overlying each other to the height of twelve feet, the lower ones much flattened by pressure. At this spot also they have suddenly ceased, terminating in a steep bank, from which they protrude in great numbers, resembling a series of rudely-pointed horizontal obelisks, weather-stained to a very dark hue, with a strong cobalt tinge. Their exposed situation at this spot has tempted the Sasseram stone-cutters, who, with wedges, have cloven blocks from off these columns for building purposes; but by so doing, have made it evident that they are not solid columns, but a series of spheres; each sphere composed of a great variety of differently colored and exceedingly hard concentric strata of siliceous sandstones, concentric upon a nucleus, but the strata exceedingly difficult to exfoliate, the rock being purely siliceous, throwing back the hammer with great force. These spheres are packed closely together, and so inti-

<sup>\*</sup> If the Pals were Buddhists, this tradition may allude to their overthrow by the Rajas of the Brahminical faith; but all authentic records of those times appear to be lost, at least in this province.—F. J.

<sup>+</sup> Bos. frontalis, or an allied species .- Cur. As. Soc.

I I enclose a copy of this letter as a part of Lieut. Rowlatt's Journal .- F. J.



mately joined by some great pressure as to resemble columns; the pressure that has brought them into contact, whether from below, above, or laterally, has caused them to be much flattened on every side, so much so that they resemble square columns, varying from two to twenty feet in length; but on a closer inspection, the joint of each separate sphere may be traced on the side of the exposed column.

The bed, as far as exposed, Fig. No. 2, is about twelve feet in height, the top row of stones generally being nearly perfect circles, of about three feet diameter, the centre ones elliptical, and the lower part of the bed is composed of a series of layers of much flattened spheres, varying from ten to two inches in diameter; and although crushed into so small a space, each individual stratum, however fine or thread-like in its structure, is perfectly preserved and well exhibited.

In Fig. 3, where with the aid of steel wedges I managed to burst open a sphere, the fracture has taken place in the middle of a thin red gravellike stratum of about one-eighth of an inch in thickness, and not through the whole strata or concentric coats, but leaving a corresponding hollow, from whence the globe containing the smaller strata and nucleus has started: upon chiselling away the outer surface of the protruding ball, another coloured stratum is discovered. In Fig. 4, a flattened globe presents its central group of strata projecting as a cylindroid; the fracture here, as is generally the case, has occurred at one of the gravel-red strata, of which nature are all the delicately pencilled concentric rings noticeable on the fractured surfaces of Nos. 1, 2, 3, 4 and 5 Figs. intermediate strata are composed of fine white arenaceous particles, intermixed with red, black, and brown particles of the same nature. The red lines, which in some specimens are almost invisible from their extreme fineness, are evidently tinged with the oxide of iron, traces of which are also visible on the outer coating of the globes. Some of these globes, flattened out to an immense size, I have calculated must have been six feet in diameter when perfectly spherical, with many hundred concentric strata, though not all perfect, some running into and crossing each other in great confusion; but the generality of the well developed strata are perfect.

It is difficult to imagine how such a series of not only concentric lines, but concentric spheres, similar in arrangement to the coats of a bulbous root, could ever have been formed upon so grand a scale, for in their formation no trace is left of the globes ever having, at any period, been at rest. Had they been so, the point d'appui, or that part pressing or resting on the ground, most certainly would not have had the concentric strata passed under it; that the strata are concentric to a common nucleus I have proved by bursting open many of the globes, the strata invariably exfoliating as in Nos. 3 and 4. The nucleus, whatever it may be, must be an exceedingly small and insignificant particle, as I have fractured through several globes to within a quarter of an inch of the innermost centre, and found nothing; the strata varying from the fineness of a hair to six inches in depth, and the spheres from six feet diameter to the size of a pea.

Having noticed a series of what I thought were the projecting edges of small shells running in a straight line nearly parallel to the major axis of one of the elliptical stones, and traversing all the strata, (vide No. 1, fig. a,) I had it broken open in that line; and in so doing, exposed to view a bed of about a foot in width, of very closely compressed blotches, of a delicately soft argillaceous substance, of a pale yellow color, impalpably fine when dissolved in water; no individual particle being visible under a powerful lens.

I traced this curious formation for about two hundred yards along the base of the hill where it suddenly ceases, the sandstone regaining its usual horizontality of stratification.

Notes, chiefly Geological, across the Peninsula of the Southern India, from Madras, Lat. N. 13° 5' to Goa, Lat. N. 15° 30' by the Baulpilly Pass and Ruins of Bijanugger. By Captain Newbold, F.R.S., M. N. I., Assistant Commissioner Kurnool, Madras Territory.

Physical aspect of the plain between Madras and the Naggery mountains. The country lying between Madras, and the Eastern Ghaut line of the Naggery hills, is a maritime plain, about 34 miles broad, rising gently towards the base of the mountains. It is watered by the Coom stream, which finds its way to the sea at Madras, and by the Cortelair which, after receiving the Naggery river, communicates with the sea by the salt lagoon of Ennore, about ten miles North of Madras.

A few gentle undulations or swells running generally to the S.W. alone interrupt the flat monotony of this great plain, the surface of



which is studded with numerous trunks, and often verdant with rice and raggi cultivation.

Plantations of the betel-vine and patches of sugar-cane are scattered here and there, and tall groves of cocoa-nuts and palmyras tower over an underwood composed chiefly of the dwarf date, cactus, euphorbia, and mimosa. These form a low jungle covering the higher sterile, dry patches, which intervene between the lower cultivated portions.

Soils. The surface soil is usually sandy, and many extensive tracts are entirely covered with a fine sand resembling that of the sea, and lateritic debris. The sandy soil occasionally passes into a silt and fine red clay, largely used in pottery and brick-making.

The subsoils are in some situations beds of kunker of various thickness, of mhurrum, or disintegrated rock, and granitic and hypogene rocks; thin beds of grey marl overlie, near the coast, beds of a black clay imbedding pelagic shells of recent species, laterite, and a loosely aggregated sandstone which passes into slate clays, both white and coloured, with oxide of iron of various shades.

Of the rocks above-mentioned granite, gneiss, and hornblende schists are found basing all the rest, occasionally rising above the surface, but in general thickly covered. The granite near the coast is usually of the variety termed pegmatite, being composed of quartz and felspar exclusively; above the surface it commonly appears in naked bosses, and detached concentrically-weathering blocks. On approaching the base of the mountains these blocks become more frequent, and are mingled with similar globular masses of basaltic greenstone, outgoings of the numerous dykes which prevail in the granite and hypogene rocks. Fragments of quartz rock, chert, jasper, and sandstone also occur, more or less rolled, derived doubtless from the Naggery beds. The gneiss usually contains hornblende.

Occasional beds of laterite occur. One I observed between Madras and Poonamallee, which passes into a loose sandstone and felspathic shale. Laterite has been employed in the construction of the fort at Poonamallee and in the revetment of the old fort of Tripassore.

Eastern Ghauts. The southerly line of Ghaut elevation appears to terminate on the N. bank of the Naggery river, south of Hodgson pettah, and farther west in the bluff peak of Naggery nose; but it, in reality, suffers a deflection westerly and southerly, forming a great mountainous

curve by Muddoordroog, Chellumpolliam, and Mymundeldroog to the great break of the Eastern Ghauts at Sautghur.

The low hills at the foot of the Naggery chain are of granite, gneiss, hornblende, schist, and basaltic greenstone. The height of the main chain itself near Cumbancumdroog, where it supports a small tableland, is stated at 2550 feet above the sea. The sandstone cliffs by which the chain is crested have a columnar aspect; but those forming the lower part of the ridge clearly proved this appearance to be deceptive, and that the rock rests in thick beds on the granite, having a dip towards the west. The columnar appearance is owing to the nearly vertical fissures which intersect the strata at right angles; and which, in the thicker beds, constitute their most marked feature. A highly illustrative instance of the jointed structure is seen in the mural sandstone cliffs cresting the sacred hill of Tripati. These cliffs usually support table-lands of greater or less extent. To the east of the chain, between it and the sea, runs a low flat-topped ridge, which for want of leisure I was unable to examine. The Naggery hills, as the traveller proceeds in a N.W. direction, lose their peculiar crested appearance, and acquire a smoother outline, -a feature possibly to be attributed to the almost total disappearance of the granite and greenstone on which they rest. The Tripati spur, however, which takes an abrupt turn to the east, resumes this appearance;\* but it again disappears in the hills of Curcumbaddy: the latter, as we ascend towards the table-land, diminish in height, and acquire rounder tops and gentler declivities, in general clothed with vegetation.

Tripati. The approach to Tripati from the south is extremely beautiful, lying over a large and cultivated plain cinctured by an amphitheatre of picturesque hills. The plain gradually slopes to the foot of the holy mountain, at the southern base of which the town of Tripati lies. The mountain itself, with its mural crest of reddish sandstone, the path for pilgrims to the celebrated shrine leading up its steep side, commanded by three antique pyramidal gateways, and the town at the

<sup>\*</sup> I have since heard from Capt. Bell, Engineers, that a porphyritic granite is seen at the western base of this sacred mountain. Greenish and dark coloured whetstones are often used by native barbers all over the country, which are quarried in the argillaceous beds near Tripati, but are not so much prized as the imported Turkey oil stones.



foot overlooked by lofty pagodas,—form an interesting study for the pencil. The surface of the plain is covered with a reddish sandy soil. The old boundary of the Tamul and Telinghi kingdoms, the Andra and Dravida-des, is in this vicinity.

Curcumbaddy. From Tripati to Curcumbaddy the road skirts the southern flank of the Tripati hills in an E.N.E. direction to Curcumbaddy. The rocks in the immediate vicinity of Curcumbaddy are of a crystalline sandstone passing into quartz rock of a white or slightly green hue, radiated with red bands.

Baulpilly. From Curcumbaddy the road at first lies over a short table-land, and then descends into the valley of Baulpilly, bounded to the E. and W. by two ranges of hills. The face of the country is covered with a thicket abounding with bamboos. The soil is red, but darker and softer, from the admixture of argillaceous and calcareous matter, than that hitherto seen : it contains vegetable matter mingled with the alluvium. Bajra, raggi, and culti are cultivated with success. The formation consists of sandstone less quartzose than that of Curcumbaddy, and of the argillaceous shales into which the Cuddapah limestone passes. The lines of cleavage in the latter are nearly vertical, and almost at right angles with those of stratification; but I did not observe them passing into the structure of the sandstone. This may be seen near the rude barrier gate of the Baulpilly Pass. The softer shales are usually found in the lower parts of the valley, and the sandstone capping these summits of the hills. Dykes of basaltic greenstone occur traversing the shales and slates; also veins of quartz. Fragments of flinty slate, chert, and jasper are frequent. The surrounding country is wild and romantic.

Codoor. The road passes partly through a bamboo jungle up the centre of the Baulpilly valley in a north-westerly direction to Codoor, a small village in the Cuddapah collectorate, 108 miles travelling distance N.W. from Madras. Here the hills on either side open out into a delightful plain watered by the Gungama, and smiling with cultivation, principally of bajra, raggi, culti, and indigo. The Pass of Baulpilly leads over a rocky belt that stretches across the valley, and forms an anticlinal line, from which the Gungama and a branch of the Calastry river flow in contrary directions; the first towards the N.W. to the Pennaur, and the latter towards the S.E. by Calastry. The



formation is argillaceous limestone passing into argillaceous shales, capped occasionally by sandstone. Extensive deposits of kunker contribute much to the fertility of the soil.

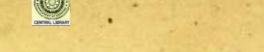
Nundaloor. The route from Codoor to Nundaloor, a distance of thirty miles and upwards, lies up the valley of Baulpilly, which is obstructed in many parts by rock spurs from the flanking ranges. Approaching Nundaloor the hills become barer, more conical and mammiform. Nundaloor is a small town, about 1371 miles N.W. from Madras, and situated on the left bank of the Baugonuddi or Cheyair stream, which flows northerly to the Pennaur river, east of Sidhout; and is here three furlongs broad, with a bed of coarse sand. The surrounding formation is argillaceous and calcareous shales, schist, and sandstone: the soil is sandy; and produces, among other articles, indigo and a considerable quantity of rice. The rice lands are irrigated by a large tank, situated a little to the west of the village, which derives its supply principally from the rain water that rushes down during the monsoon from the tops and sides of the hills lying to the westward. Palmyras appear to thrive in low situations in the sandy soil. In some of the hills in this vicinity the lines of stratification can be distinctly traced, even at a considerable distance. The strata dip at an angle of 12° to the south of east; the strike of the beds N. by W. The cleavage lines of the shales and schists are much more vertical than the planes of stratification, forming with them an angle of about 45°, but dipping in the same direction. The latter are distinctly marked, even in hand specimens, by alternate parallel light and dark bands. The seams are often filled with friable calcareous incrustations. From a compact argillaceous slate of a light greyish green with fine chloritic laminæ, it passes into white and purple shales. Minute spangles of mica occur disseminated. The sandstone, as we recede from the granite, becomes less crystalline, and acquires argillaceous matter, though veins of white quartz are still seen traversing it. The light coloured argillaceous slate, held in the platinum forceps before the blowpipe, whitens and fuses into a whitish enamel; the purple shale after deepening in colour melts partially, and with difficulty, into a number of minute greyish globules. With borax it fuses into a light green glass, which becomes greyish on cooling; and, with carbonate of soda, with effervescence, into a glass of a darker green. The soil here is sandy and calcareous; debris of the sandstone, limestone, and clay



slate. From Nundaloor the range of hills flanking the western side of the valley is crossed by a defile to the plains of Cuddapah. The summits of many of these hills are capped with sandstone; while limestone and its associated shales are seen near their bases in the vallies, as at Wontimetta and near Bankrapet.

Cuddapah. Cuddapah is situated at the western entrance of the flat valley of the Pennaur, from which river it lies about six miles south. The height of the plain, in the midst of which Cuddapah is situated, is about 500 feet from the level of the sea. The Pennaur flows at the base of the northern range in an easterly direction towards Nellore, below which it disembogues into the Bay of Bengal. The stream, on the banks of which Cuddapah stands, takes its rise in the hills to the south of the place, and pursues a northerly course to the Pennaur. Other streams of minor note intersect the plain. The soil covering the surface is generally black, mixed with sand and calcareous matter: to the west of the cantonment, a thin stratum of sandy soil overlies a bed of kunker, from one to four or five feet thick; in some places compact like travertine, and in others having a pisiform, tuberose, and tufaceous structure. Some specimens when broken exhibit a crystalline radiated structure; others a concentric form. Below this lies a bed of limestone, generally purple and of a shaly structure, mingled with argillaceous matter. The bed of kunker, however, does not always intervene: the latter rock, where it is tufaceous, has often a concentric appearance resembling stalactite; and sometimes appears in pisiform concretions both detached and adherent to the subjacent mass. It is still in process of formation from water slowly percolating from below; the stems of the grasses around which it has formed, are often found undecayed.

Eastern Range. Ghauts, North of Cuddapah. On ascending the range, north of Cuddapah, where it overlooks the diamond mines of Chinnoor and Ovalumpully, I found the base and sides to be covered with angular fragments of a very hard ferruginous sandstone. Advancing a little way up the ascent, a narrow bed of a greyish quartz, following the line of bearing, is crossed. Here and there slightly convex plateaus of compact crystalline sandstone, passing into quartz rock, of various shades of red, are observable amid the loose blocks and vegetation with which the surface is almost concealed. Large amorphous masses of the greyish quartz rock appear at irregular distances on the summit; some of them ten feet high.



Fragments of the same are strewed around, partly lying upon, and partly imbedded in, a fine reddish soil resulting from the weathering of the subjacent rock. Near the summit I picked up pieces of a vesicular ferruginous rock with tubular sinuosities, a species of laterite, and apparently of the same structure as that on the summit of the Ganjicotta hills. The tops of these, as well as of the other hills in the vicinity, present slightly convex plateaus forming table-lands of circumscribed extent. The relative altitude does not suffer any considerable variation, not exceeding, I believe, 1500 feet above the level of the plain. The sides are deeply indented by abutments jutting out at right angles to the line of bearing. In the ravines that separate them, fine echoes are produced. The sides and summits are thickly clothed with vegetation and low forest. The wells at the base of the range to the south of Cuddapah are cut through strata, varying from eight to twenty feet in thickness, of compact and tufaceous kunker.

Bankrapet Range, South of Cuddapah. Passing the small tank of Ipa-Penta, the ground gradually ascends and becomes jungly. Several rivulets are crossed until a rather high ground is reached, where two defiles branch off; the one to the left or east, leads to the water-fall of the Pedda Garhi, and the other to the right to that of the Chinna Garhi. There I pitched my tent on the right bank of a stream, and proceeded on horseback over a stony jungly path winding through defiles, overlooked by jungly hills and mural precipices of sandstone. The Pedda Garhi is one of those singular fissures through the sandstone, like that of Ganjicotta, cleaving the rocks diagonally across the line of stratification from the summit to the base. The sides are precipitous rocky façades, narrowing rather abruptly, as the traveller advances southerly, into a fissure two or three yards wide, with salient and re-entering angles. At the base of the western cliffs are pools filled with the clear water, which drips in a perpetual rain from seams in the disrupted stratified rocks which have a dip of about 8° to the N.E. The precipice on the left, or on the north-east, distils no water. Here we see one of the very few illustrations observed in Southern India of the theory of springs. The water evidently percolates through the porous strata capping the higher adjacent summits to lower impervious beds, where collecting it follows the dip of the strata, and finds an exit in the fissure which has



broken off the continuation; between the rocks on the right and those on the left, the latter are of course perfectly dry. The cleft in the rock proceeds, according to the natives, to a considerable distance, till at length, from the height and closeness of its high rocky walls, the rays of the sun are excluded. Natives from superstitious motives dread exploring its recesses, and tell many incredible tales of the vengeance with which the Genius Loci has visited intruders. The bottom of the fissure is completely covered with water to an uncertain depth. Hundreds of the finny tribe sport in the clear depths of the water, which I could not persuade the guides to attempt to catch, as they hold them sacred.

Chinna Garhi. I now proceeded to the smaller spring, or the Chinna Garhi. Here the water gushes in a small silvery cascade from a cliff about 200 feet high into a deepish pool among the rocks below, disappearing through a narrow cleft, probably a continuation of the principal fissure, to re-appear in the form of a spring below by some fault or dislocation in the strata. In the rains it cannot run off by this outlet as fast as it collects, and a large deep bason is formed, as evinced by the black ferruginous coating with which some of the rocks in the vicinity are covered. The temperature of this pool I found to be 68.5°, three feet below the surface; temperature of air in shade 80°; in sun 86°. The dropping of the thermometer into the water disturbed hosts of the small fishes that rose to the surface, evading all my efforts to catch them. The water is remarkably transparent, sparkling, and agreeable to the taste, probably from containing a large proportion of fixed air.

The formation of the range in this neighbourhood is a reddish white, and greenish sandstone, interstratified with shales of various shades of purple and light green, and passing into quartz rock, or arenaceous schists. Large cavities occur filled with beautiful crystals of quartz, and a little hæmatitic nodular and stalactiform iron ore. I observed a furnace for the smelting of this at the foot of the range. The rocks are distinctly stratified, having a dip towards the North and East, varying from 12° to 6°. The joints dip about 70°, and are crossed by others at nearly right angles, separating the masses into cubes and rhombs. The ripple mark is seen very distinctly on the lamina of some of the arenaceous schists. The soil is a light red, and sandy: the vegetation



on the hill sides, luxuriant. Few of the trees or shrubs were seeding or flowering, but amid a multitude of others I observed the Tectona grandis, Dalbergia latifolia, Pterocarpus Santalinus, Erythrina indica, the Mimosa Xylocarpa, Carissa spinarum, and the Ixora parviflora used for torches. In the plain are seen the Aloe perfoliata, Euphorbia, Cassia auriculata, Ficus indica, Elate sylvestris, Borassus flabelliformis, Melia azadirachta, Tamarindus indica, and the Asclepias gigantea. The principal articles of cultivation are saffron, indigo, white juari, raggi, rice, castor oil plant. Among the wild animals frequenting the hills are the tiger, leopard, bear, porcupine, wild bear, several varieties of monkeys, and also the Indian land tortoise.

I returned to my tent about 4 P. M., after being nearly twelve hours on horseback, and twenty-four hours without refreshment.

Started at three o'clock this morning towards Cuddapah: after about eight miles ride arrived at the Bhuga. This is a sacred spring in a shady Tamarind tope. The Hindus have erected a small Gopar over it, and conducted the water from the mouth of a sculptured cow or bull, to be seen at the bottom of the clear pool in which the water collects. In the shade of the tope stands a temple to the tutelar god of the spring, Bhugama Iswara; hard by are five or six other springs bubbling from the rock, and following into the river close by. The temperature of the two springs, which I tried at sunrise, I found to be the same, viz. 88°; of the water in the river 72°, and of the atmosphere 65°. The springs are evidently thermal. The cause of their appearance is a fault in the subjacent sandstone strata. They lie about ten miles N. by E. from the Pedda Garhi. The water appears perfectly pure and well tasted.

Chillumcoor. This village and halting place is about twenty-six miles and a half to the westward of Cuddapah. It comprises about eighty houses, inhabited chiefly by kunbis, or cultivators. There are also a few Brahmans and Mussulmans. It seems to have once been a place of greater importance, and its pagodas have an air of considerable antiquity: they are dedicated to Iswara and Hanuman. Inscriptions on slabs of red sandstone now lying prostrate, do not afford the date of the building of these structures; but inform us that the temple to Iswara was endowed by Harihara, king of Bijanugger, in 1305 of the Salivahana era, or



about A. D. 1383. The small lath, or pillar, in front of the temple to Hanuman, according to the inscription, was erected A. S. 1670 by Ram Reddy of Chintalconda, and Chunapa Reddi of Vellipaulum.

Cotton, indigo, raggi, juari, bajra, are the staple articles of cultivation. Soil, principally Regur with saline patches, taken advantage of by natives for the manufactory of salt. The adjacent country is a plain bounded to the north and south by low ridges of hills. Near the village the limestone alternates with thin beds of sandstone passing into a greenish arenaceous schist. A trap dyke has crossed both rocks; but, from the deep superstratum of soil the line of junction could not be seen. Fragments of rocks converted into jasper are seen marking the course of the dyke, which is attended by a profuse development of kunker. Incrustations of muriate of soda occur between the laminæ of the arenaceous schist, as may be seen in the well near the Traveller's bungalow. A little beyond this, a bed of a granular crystalline limestone is seen in contact with this schist, which, from the massive character of the detached blocks, and the structure and colour\_ of the rock itself, has much the appearance of a grey felspathic granite or trachyte. To the N. E. it passes into a breccia with angular fragments of the arenaceous slate, siliceous limestone, chert and jasper imbedded. The presence of the two last minerals indicate the formation of this bed to have taken place subsequent to the intrusion of the trap dyke, which appears to have broken up the limestone and schist into the fragments now impacted in the crystalline breccia. The following is a section presented by a well in the neighbourhood of the village. (See Plate.)

The kunker is often dug out in rough square masses, and used in building walls. Blue limestone, with iron pyrites in nearly horizontal strata, is seen in the beds of all the rivulets in the neighbourhood, and also in the bed of the Pennaur, which flows about eight miles to the north of the village. The nearest hills are of sandstone.

Chittawarapilly. The road passes for the most part between two ranges of sandstone passing into arenaceous slates of various degrees of fineness and compactness, which generally dip at an angle of 6° to the E. N. E. The higher hills are crowned with thick beds of sandstone supporting table-lands. Vertical joints and fissures often intersect these

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Aronaceous schist in nearly portions of subjacent rock. Kanker imbedding broken up Regur with sand horisportal strata

Plate to Not of Capt
Vemboid's Geological Notes



nearly tubular masses, which give an appearance of a wall of Cyclopean masonry, running in a line with the crest as far as the eye can reach. The lower beds will be generally found schistose, and of smoother outline.

Range to the South of the Bungalow. The eastern extremity of the range to the south of the road has a remarkably rugged appearance, and large masses of rock lie precipitated on its base and sides. On ascending to ascertain the cause of disturbance, I found the hill to have been penetrated by the ramification of a large basaltic dyke. The rock composing the dyke passes from a porphyritic to a compact structure. Pale green felspar crystals are imbedded in a crystalline paste of hornblende. Circular and oval cavities, filled with a faint reddish mineral resembling cornelian, and a white mineral resembling prehnite, are found in the greenstone. In the compact varieties augite replaces the hornblende. Near the summit of the hill the basalt appears in four and five sided prisms, about a foot in length, the lower part of the joints convex, fitting into the concave surface of the supporting prisms. A thin incrustation of carbonate of lime occurs between the prisms. The sandstone is highly quartzose, and ferruginous, and acquires a cellular slaggy structure resembling some varieties of laterite.

In wandering among the chain of hills to the S. of the Bungalow, I picked up some slabs of laminar sandstone, from the surface of which project oval and circular concentric concretions, from the size of a shilling to that of a half-crown in circumference. The outer circle is nearly white, the second darker, enclosing a hard solid nucleus. These concretions are harder than the imbedding sandstone, from which they are with difficulty separated, and by weathering less rapidly, project in relief on the surfaces of air-exposed slabs: they penetrated from half an inch to an inch into the substance of the rock. When broken, they do not differ in appearance from the sandstone, except in being a little whiter, and of a finer sand. Some of the more finely laminated slates present on their planes vivid dendroidal delineations.

Range to the North of the Bungalow. The sandstone hills to the North of the Bungalow support the table-land of Ganjicotta. Ramifications of a greenstone dyke are seen to run along their base, attended by a profusion of kunker deposit.



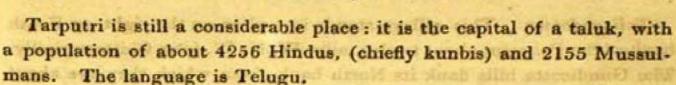
Tallapodatoor. This village stands in a plain on the right, or South bank of the Pennaur, about twelve miles W. N. W. from Chittawaripilly. The Gundicotta hills flank its North bank, from which they are about three miles direct distance. At their base I found a siliceous greenish slate which, higher up the ascent, is capped by tubular masses of sandstone dipping conformably at a slight angle of about 4° to N. E. The general direction of the strata, and of the chain itself, is nearly S. E. The laminæ of the slates also run S. E., and are intersected by nearly vertical joints at short distances running E. S. E. These fissures pass into the superjacent sandstone. Cavities, which have apparently once been filled with a ferruginous earth or clay, are here frequent in the faces of the sandstone cliffs.

Concretions in the Sandy banks of the Pennaur. The steep bank of the Pennaur near Tallapodatoor is composed of a thick accumulation of sand, silt, quartz, and jasper pebbles, and kunker. The latter is seen often in stalactiform concretions in the substance of the sand and silt, which have been formed by the infiltration of water charged with lime. In many instances these concretions have formed round the stems and roots of grasses, some of which are still vegetating within their stony case; but by far the greater portion have withered, passed into dust, and fallen out leaving cavities or casts.

Small dunes of sand are seen in this vicinity on the South bank of the Pennaur drifted by the N. W. winds.

Tarputri. At Tarputri, the next march, are two handsome pago-das, dedicated to Chintal Raya and Ram Iswara, elaborately decorated with sculptured bas-reliefs representing the exploits of Rama, and the adventures of the Indian Apollo, Krishna, and other mythological events. Among them is a figure holding a bow, made like the Grecian bow, a form rarely met with in Hindu sculpture. The unfinished gateway of dark basaltic greenstone presents a mass of graceful sculpture scarcely excelled, in my opinion, by any thing in the ruins of Bijanugger, or Mahavelipur, though on a much minor scale.

The three Sassanams or inscriptions on stone in these temples, which I had copied, were in the Telugu character and language, may bear date severally 1429, 1431, and 1435 of the Salivahana era, and the name of the then reigning sovereign at Bijanugger, Narsengha Rayel.



From Tallapodatoor to Tarputri, (about ten miles). The road lies over an extensive plain watered on the north by the Pennaur, covered with regur and a soil of a dark coffee red, except where limestone prevails, when it assumes a cineritious colour. The substratum is generally a bed of kunker. Trap dykes are frequently crossed. Tarputri is situated on the right bank of the Pennaur. The only hill in the vicinity is of greenstone, associated with a greenstone slate curiously mottled by dark oval spots. On the summit of this hill, I found kunker imbedding angular bits of the rock. Beyond Tarputri, near Vaimpully, close to a dyke of basaltic greenstone, masses of calcareous spar with quartz are seen jutting from the surface, many of them incrusted with drusy crystals of quartz. The spar, in some instances, has been penetrated by the basalt, and coloured of a dull green. Fragments of jasper, flint, chert, brown, green and white, are strewed on the surface. Mounds of kunker are also frequent. Trap dykes continue from Vaimpully to Ryelcherroo.

Ryelcherroo. Near this place limestone, sandstone, and sandstone conglomerate prevail, associated with jasper and chert. Tippoo, it is said, dug a considerable quantity of the latter for musket flints. hill in which the excavations lie, is about 11 mile S. W. from the small fort. Its base consists of a greyish laminar limestone, with a rugged external appearance, and veined with calcareous spar and quartz. Ascending the hill, the limestone becomes less crystalline, and changes its colour to shades of a greenish blue and pale flesh colour, until the sandstone conglomerate, by which the hill is capped, is reached. A little below the summit amid the blocks of pudding stone and sandstone, lie Tippoo's excavations for flints; they are dug out in externally ochreous and rusty coloured, irregularly shaped, blackish, grey and white masses. They are a variety of chert far less tough than the English flint of the chalk formation, splitting easily on a smart blow. The summit of the hill is strewed with pieces of red jasper, and pebbles of a flinty quartz and calcareous spar.

A native of the village turns neat cups and vases from a pale yellowish and white magnesian limestone, which is procured at a hill in

the Pupál jungle near Yengunapilly, about eight or nine miles in a southerly direction from the Bungalow.\* It is a low hill, rising abruptly from the Regur or cotton ground at its base, with a gentle slope from the east into low cliffs of limestone which front the west, towards which quarter the hill falls with an abrupt and steep declivity. The surrounding hills are mostly of sandstone. The base is composed of a crystalline bluish grey limestone passing, as the cliff ascends, into a number of beautiful shades of red, yellow, green, and white. Some dark green varieties resemble precious serpentine; others imbed silvery white, and yellow pyrites. Calc spar, white, fibrous, and pale yellowish brown, occurs in veins, and coating fragments of rock. On the eastern slope of the hill is an excavation, whence the Brahmins dig a chalk, which is used for marks of caste, and for white-washing houses. At Putsa Marculpilly a massive asbestus, associated with a white magnesian and calcareous earth, occurs in a bed in the limestone. The former is of a dull greenish grey colour, passing into a mottled yellowish white. It is tough under the hammer, and breaks into fibrous flexible fragments.

Junction line of granite with the Limestone and Sandstone formation near Yairypully. A mile or two west from Ryelcherroo, between the granite range north of Gooty on the west, and the limestone and sandstone hills of Ryelcherroo on the east, extends a plain about a mile broad intersected by a nullah, which I examined in vain for a section showing the junction of the limestone with the granite. The surface of the plain is covered with angular pebbles of quartz, chert, jasper, and of a breccia composed of angular bits of quartz, derived probably from the granite, imbedded in a jaspery paste, and of a sandstone grit imbedding reddish jasper and chert, which is seen in veins in the limestone. The limestone composing the hills on the eastern boundary of this plain is siliceous; so much so, as to afford sparks with steel. It alternates in the same hill with a purple and yellowish shale, and a crystalline sandstone, which is generally found capping the summits. There are a few exceptions, however, where the limestone continues to the summit, the sandstone having been stripped off by denudation.

<sup>\*</sup> The Mussulmans, from the supposed qualities of the stone in discovering poison, call it "Pad-zahr," or Bezoar stone. By the Hindus on the spot, it is called "Gurha Putsa Rai."



Veins of calcareous spar and quartz intersect both rocks; the former also occurs in filbert-sized nodules in the looser varieties of the sandstone. The strata dip at an angle of 10° from the granite towards the E. The direction of the sandstone ranges is S. 45° E. The surface of the limestone is grooved with furrows, which have a generally south-westerly direction. This surface is uneven, unlike the regular polished surfaces formed by glaciers.

Crossing the plain towards the granite, the fragments become more quartzy, and at the base of the nearest granite hill runs a belt of a pale reddish jaspideous rock in an E. 10° S. direction, penetrated by numerous quartz veins. Large beds of quartz occur also in the granite, and are often seen between this and Gooty to form entire hills. The limestone and sandstone terminate in a small hill on the left of the road, a little to the east of Yairypully, about nine miles E. from Gooty. The pebbles of the conglomerate have not been transported from any great distance; the angular ones appear to have once formed part of the jaspery and chert veins, which traverse the limestone; and the rounded pebbles have probably been carried by the stream from the adjacent hills. Their course may also account for the furrows just alluded to, on the surface of the limestone, on the summits of those hills which have not been capped by the conglomerate.

Gooty. The limestone and sandstone formation is now taken leave of. From the village of Yairypully, about nine miles east from Gooty, nothing but granitic trap and quartz rocks, associated with gneiss and hornblende schist, present themselves; the latter form several picturesque peaks to the left of the road. The rock of Gooty is a vast precipitous mass of a sienitic granite, composed principally of reddish felspar quartz, a little mica, hornblende, and actynolite. The actynolite occurs with felspar in thin veins of a lively green, or in drusy surface crystals. At its base, gneiss occurs with beds of a brilliant hornblede schist, dipping at an angle of 62° from the hill, i. e. to the west. This schistous bed forms the rising ground on which the Idgah stands: it is penetrated by quartz and granitic veins, which I was unable to trace to the main rock. It imbeds nests and drusy crystals of actynolite. Dykes of basaltic greenstone are numerous.

Height of Gooty plain and rock. The approximative height above the sea by the boiling point of water of the plain at the base of the Gooty



rock is 1200 feet; and that of the summit of the latter above the plain, about 900 feet. From the old flagstaff at the top is a fine view extending over a sea of hills to the East and Northward; and over the great regur plains of the Ceded Districts to the West. To the South the Gooty range is prolonged to the Cuddapah and Mysore frontiers.

A dark narrow cavern infested by bats is shown in the granite near the top of the rock, at the bottom of which is a well which the natives affirm, with little probability, communicates with the Paumri stream in the plain below. Gooty is said to have derived its origin from the Rishi Gotama's residence on the rock. The fort is naturally of great strength, and the favourite abode of the Mahratta chief, Morari Row.

Goontacul. Between this place and Gooty, from which it is about twenty miles West, granite, hypogene rocks and basaltic greenstone prevail; the latter is seen often in long low black ridges of blocks piled one upon the other like a huge wall of masonry, and penetrating the associated rocks. The blocks and masses seen in the plain North of the village of Guntacul are principally of the usual granite of India, composed of felspar, quartz, mica, and hornblende, and schorl but rarely: the crystals of felspar are large and well defined. This large grained granite is penetrated by veins of a smaller grained granite with reddish felspar, and a few plates only of mica; veins of compact opaque quartz coloured by actynolite, are often numerous. Schorl occurs in the blocks of granite seen scattered near the great tank of Rayelcherroo.

We now cross into the ancient Hindu kingdom of the Karnatak from that of Andhra. Both Telinghi and Canarese are spoken here and at Gooty; but a little farther Westward, Canarese prevails.

Guddacul. Overlooking the bungalow on a craggy hill, stands a small conspicuous pagoda to Chouri Amma. It is the easternmost of a broken range from the W. N. W. At its Northern base is a thick bedded gneiss, with dark coloured mica in scales. The upper part of the hill is occupied by masses of red sienitic granite with thin veins of quartz and felspar coloured by actynolite. The crystals of hornblende disintegrate into a rusty coloured powder, which leaves cavities on the surface of the rock in falling out.

The rock on which the small fort stands is also of sienitic granite, penetrated by a greenstone dyke. At its base is an excavation, about eight feet deep, into a greenstone bed or dyke.



It is in various stages of disintegration, which has been hastened and modified apparently by the infiltration of water containing carbonate of lime and muriate of soda. The dark hornblende crystals have been converted into the green hue of diallage, which passes into a greenish yellow and feuille morte, and other deeper shades of brown. It is reticulated with seams, filled and lined with kunker. I have seen this singular effect produced on the colour of hornblende under similar conditions, in various parts of Southern India. It is probable, that the green, or greenish yellow-coloured rock, if analysed by the chemist, would afford different results to those yielded by the hornblende rock prior to disintegration. Thus rocks and minerals often decay only to appear in other and often more beautiful combinations.

The sienitic granite here exhibits great variety in structure and colour, from close-grained to porphyritic: flesh-coloured felspar and light green actynolite occur in veins.

Bellary. The clusters of rocks on which the fort of Bellary stands, those overlooking the Ball-practice ground, and the Peacock hills in the vicinity are all composed of a crystalline granite containing hornblende in addition to the usual components. The greater proportion of the felspar in this granite is flesh coloured, and imparts a prevailing tinge to the rock. The granite occurs in all its varieties in one mountain mass, compact and porphyritic, red and grey, micaceous and hornblendic.

The Peacock hills, and the broad-backed rock on which the fort stands, are nearly covered with loose cubiform blocks and rounded masses of granite, which appear as if shot out suddenly on the ground from some enormous cart. Many rise suddenly from the flat plain, like inverted tea cups on the surface of a table. Such is the aspect of most granite masses of S. India.

Tors and logging stones abound in the Peacock hills and on the cluster near the Ball-practice ground, where occurs that singular pile figured in the XIIIth No. of the Journal Royal As. Soc. in the article on the quarrying granites of Egypt and India. Here also is seen, one of those curious piles of calcarcous scoriæ, attributed by the Hindus to the Racshasas of old.\*

<sup>\*</sup> Vide No. XIII, Journal Royal As. Soc., p. 129, &c.



Garnetic gneiss and leptinitic gneiss occur around the bases of these granite rocks in contorted strata; and further to the S. and W., rise the hornblende and chlorite schists into the ranges of Boodihal and the Copper mountain.

Copper Mountain. This dome-shaped mountain is the highest point of a ridge which runs by Jondoor N. Westerly to the Tumbuddra near Hospett, and about five miles Westerly from Bellary. It is said to be 1500 feet above the plain at its base, which at Bellary is about 1600 feet above the sea according to General Cullen's measurements. The great plain at its Eastern base extends Easterly as far as Gooty, Northerly to the North bank of the Kistnah, and Southerly to the Mysore frontier: it is for the most part covered with a rich sheet of regur, resting either on kunker or the debris of the subjacent granitic and hypogene rocks; and in addition to the bajra, and other dry grains of red soils, smiles with extensive crops of cotton, wheat, and the white juari.

The inferior ridges at the base of the range are chiefly of gneiss, and a reddish and faint greenish quartz rock. The great mass of the ridge is composed of hornblende schist passing into chlorite and earthy ferruginous schists, capped by a wall-like naked ridge of a dark brown rock composed generally of a greyish chert, and brown iron ore, or jaspideous red and brown clay, in alternate layers, and resting apparently on their edges; in fact, a ribbon jasper on a large scale. The laminæ are often highly contorted and waving. The crest is often broken up by transverse fissures or joints; and, at more than one part of its crest-like course, has suffered manifest disturbance. Its general direction is S. Easterly.

A columnar mass, about 50 feet high, crowns the ridge, not far from the copper excavations, and serves as a guide-post to their site, which is nearly obliterated by earth and fragments of excavated rock, and can be hardly found without the aid of a *Tulari*, or of a person who has previously visited them. A crater-like cavity, on the top of a small mound a few yards in diameter and of little depth, was pointed out as one of the excavations for copper made by order of Hyder. I examined the sides and bottom of this cavity, but did not discover any vein of the ore in the rocks composing them, though traces of the green carbonate in their seams and incrustations are seen on the refuse thrown out. On the right



of the ridge a little farther to the N. W., is another excavation at the base of the rocky crest of the range.

The ore appears to have existed only in these thin incrustations and seams, (for I could not find the slightest trace of any continuous lode or vein,) and the project was shortly given up by Hyder. The imbedding rock is a ferruginous slate clay, and the ferruginous quartz rock of the crest.

From the vicinity of these excavations rises the dome-shaped summit before mentioned, as the loftiest peak of the ridge. Its summit is flat-convex, and capped with laterite containing much iron. This tubular mass is precipitous on its S. W. side, and contains two apparently natural caves situate at the bottom of the precipices, of small dimensions.

In one of these stood the shrine of the tutelary deity of the mountain; and recent offerings of flowers, oil, and cocoa had been made in this rude rock temple. On the roofs and sides of these caverns are partial incrustations of common salt and alum, which appear to have been deposited by water percolated through the porous mass above, and which contains sulphuret of iron, by the decomposition of which the sulphuric acid has been set free.

This peak formed one of the stations of the Trigonometrical survey: a pile of stones on its surface marks the stand probably of the flag. The thermometer in the shade during the hottest part of the day stood at 72° Farenheit only, (July.)

Descending the ridge N. of this peak, a large dyke of trap is seen crossing the mountain in a westerly direction. White potter's earth, kunker, and smoky quartz occur in the vicinity. At the base, a small seam of whitish saccharine limestone (marble) is seen in the hornblende rock.

The singular ranges and valley of Sondur to the Westward of the Copper mountain, have been described already, (Madras Journal for Sept. 1838, p. 128).

Ringing stones of Courtney. A little to the S. E. of the village of Courtney, about ten miles W. N. W. from Bellary, to the left of the road is a low, long, black ridge composed of blocks of basaltic greenstone piled one upon another,—the outgoings, in fact, of a dyke which penetrates and projects from the surrounding granitoidal gneiss rocks.



Their piled and separated appearance is entirely owing to that natural process of spontaneous splitting, and concentric exfoliation when exposed to the atmosphere, which I have attempted to describe elsewhere.

These blocks, like phonolite and other rocks of basaltic origin, give out a metallic sound when struck by a stone or hammer: and here, from the peculiar and often delicately poised position of the blocks, the effect is greatly enhanced. A few years ago an ingenious person in London made a sort of harmonicon from slabs of basalt and other rocks. The course of this dyke is South-westerly.

Daroji. From Bellary to the great tank of Daroji, about fifteen miles, the plain is flanked to the westward by the Copper mountain range, which is gradually neared. Granite and gneiss are seen in low hills and masses along its western base. A spur of this range ends at the S. E. angle of the Daroji tank, throwing out a few outliers in the direction of its line, viz. N. W. by N. This natural barrier line of elevation prolonged by an artificial embankment, or "bund," of stone and earth, nearly three miles long, dams up the water flowing down the sides of the ranges to the West, North-west, and South. It continues to the village of Daroji, beyond which is another outlier of the Copper mountain range.

One of the rocks in the line of the tank bund presents a vertical section of the strata, which do not materially differ from those forming the crest of the Copper mountain already described, and have a similar vertical arrangement of laminæ. Traces of the green carbonate of copper also occur in it, and similar incrustations of the sulphate of alumina of an earthy texture, are found at the bottom of a quarry in a small hill crowned by a Hindu temple on the bund of the tank. Small seams in the rock are filled with this mineral. Laterite, associated with a blistery, and mammillary iron ore, occurs in a few small overlying patches.

A little to the North of this, beyond the village, lies a small hill of chloritic schist; and on its flanks, a lofty and extensive outburst of granite forming a chain of naked rugged peaks separated by deep transverse gaps or valleys, stretching towards the South. It flanks the plain West of the tank, and diverging towards the W., is lost in the still loftier elevations of Sondur.



At its contact with the chloritic schist the granite loses its mica, becomes a pegmatite, and is seamed with vertical lines of cleavage. The felspar of the granite becomes more compact, and is of a pale pink colour. Its quartz often acquires a greenish blue tinge, probably from the contiguity of the chlorite, and its structure becomes prismatic. Dark dendritic markings occur on the superficies of the prism.

A few feet from the line of contact the mica reappears in the granite. Thin flakes of chlorite, however, are visible in its structure, which impart to it a somewhat laminar character. Actynolite also occurs in the veins of eurite, quartz, and felspar, with which these mountain masses of granite are intersected.

The chloritic schist has been hardened and often converted into jaspideous rock at the contact. The smooth surfaces and the prismatic fragments into which it splits, on being struck by the hammer, exhibit dark arborescent delineations on a pale greenish yellow ground curiously contrasted with the dull, greenish blue colour of the schist. Short veins from the granite are seen penetrating the chlorite schist; and it is evident that, at this point at least, as at the celebrated locality of Glen Tilt, the granite must have penetrated this hypogene rock in a liquid or semi-liquid state. Some of the seams in both rocks are lined or filled with calcareous incrustations.

Bijanugger. From Daroji to the celebrated ruins of Bijanugger (about fifteen miles) the route lies through low clusters of hills principally of granite and gneiss. The felspar of the granite is usually reddish, and it is often coloured by actynolite of lively shades of green.

From the low grounds between these hills, hornblende and chloritic schists are frequently seen out-cropping, and are the outgoing of numerous basaltic dykes, the general direction of which is Westerly and Northwesterly.

Angular and slightly worn fragments of a coarse variegated jasper, a ferruginous quartz and indurated clay, occur scattered on the surface of the valley along which the road lies, mingled with fragments of the other rocks in sitā. It is probable these fragments of jasper have been derived from the Sondur ranges on the left or W. The range on the right, as Bijanugger is neared, assumes the more rugged and indented aspect peculiar to granite.



The whole of the extensive site occupied by the ruins of Bijanugger on the South bank of the Tumbuddra, and of its suburb Annagundi on the Northern bank, is occupied by great bare piles and bosses of granite and granitoidal gneiss separated by rocky defiles and narrow rugged vallies encumbered by precipitated masses of rock. Some of the larger flat bottomed vallies are irrigated by aqueducts from the river, and appear like so many verdant Oases in this Arabia Petræa of Southern India. Indeed some parts of the wilderness of Sinai reminded me, but on a far grander scale, of this huddled assemblage of bare granite rocks on the banks of the Tumbuddra. The formation is the same, the scantiness of vegetation, the arid aspect of the bare rocks, and the green spots marking the presence of springs, few and far between in the depths of the vallies, are features common to both localities.

The peaks, tors, and logging stones of Bijanugger and Annagund indent the horizon in picturesque confusion, and are scarcely to be distinguished from the more artificial ruins of the ancient Hindu metropolis of the Deccan, which are usually constructed with blocks quarried from their sides, and vie in grotesqueness of outline and massiveness of character with the alternate airiness and solidity exhibited by nature in the nicely poised logging stones and columnar piles, and in the walls of prodigious cuboidal blocks of granite which often crest and top her massive domes and ridges in natural Cyclopean masory.

The granite clusters of Bijanugger are continued on the opposite or Northern bank of the river to Annagundi and Gungawutti in the Nizam's territories. On the East they are bounded by the great regur plains of the Ceded Districts, and on the West by those of the S. Mahratta country. The country to the S. has already been described.

At first sight these elevations appear to have sprung up confusedly without order or arrangement; but I found, after ascending the loftiest summits, and after a careful examination of the direction of the laminæ in the gneiss, interstratified beds, veins, and fissures, on both sides of the river, that the great general line of dislocation nearly follows that hitherto observed, viz. N. N. W. and S. S. E. and that the rock opening through which the Tumbuddra flows is a cross valley.

A few caves, both natural and artificial, occur in the granite. The natural caverns are usually fissures roofed by precipitated blocks, or the



spaces left between great superimposed masses of rock, and not, as in limestone, laterite, &c., galleries, or caverns in the substance of the rock itself.

The rock temple to Rungasami is in a low, dark cavern, formed partly by a fissure, and partly by artificial means.

The marks of the chisel in the granite quarries whence was excavated the material for constructing the great monolith statues, the temples, palaces, walls and aqueducts of this once magnificent city, are as fresh as if only of yesterday. Those in the blocks quarried from Syene in upper Egypt are almost equally as recent looking; a phenomenon attributable in part, to the great dryness of the atmosphere.

About a mile easterly from Nimbapur, a small hamlet in the suburb of Bijanugger, lies an oval-shaped heap of calcareous scoria, about forty-five yards long by about eighteen broad, and from ten to fourteen feet high, partially covered by grass and other vegetation. It is evidently artificial, and of considerable antiquity. The Brahmins aver it to be the ashes of the bones of the Giant Walli, or Bali, an impious tyrant slain here by Rama on his expedition to Lanka (Ceylon\*.)

After passing a week in these interesting ruins, engaged in having the inscriptions on stone copied, rambling among its deserted temples and collecting the marvellous legends of the few priests that now linger on the principal sacred spots, I proceeded along the western flank of the Sondur hills, on the right bank of the Tumbuddra, towards the ferry into the S. Mahratta country at Humpsagur. With regard to the inscriptions it may be remarked, en passant, that the greater part are in the old Canarese character, (but the language is often Sanscrit,) and chiefly dated in the 14th and 15th centuries. One of them is curious, as showing that the bridge over the Tumbuddra was constructed by the Hindu prince Ramnatha, prior to the Bayel Dynasty of Bijanugger; this is in Nagri character, on a stone at the foot of the mountain on which Hanuman is said to have been born, date A. S. 1211.

Hospett. Hospett lies about five miles W.S.W. from Bijanugger, near the point where the two ranges enclosing the valley of Sondur end, and

<sup>\*</sup> For an account of these heaps of ashes, vide Journal Royal As. Soc. No. XIII. p. 129, &c.



nearly meet, being connected by a high and massive embankment of stone and mud. These ridges have already been described, (Mudras Journal of Literature and Science.)

A dyke of basaltic greenstone crosses the plain between Bijanugger and Hospett in a westerly direction. It forms an eminence, on which is situated an ancient Mahomedan burial ground, a little to the W.N.W. of Camlapoor.

Granite blocks, with much red crystalline felspar, are seen in the ditch of the fort of Hospett.

Proceeding towards Humpsagur, the road lies along the stone embankment just mentioned. Gneiss is seen immediately at the eastern base of the hills, but their bulk is composed of a dull green horn-blende schist, with much silex and argillaceous matter, crested by a jaspideous rock similar to that cresting the Copper mountain. This rock contains nests, and layers of iron ore and loadstone, or iron ore with polarity. This I first discovered in setting down my pocket compass on one of the ferruginous-looking masses which project from the surface of the mammiform hill overlooking Hospett, when I was surprised to see the north pole of the magnet whirl suddenly round to the south,—a hint to be careful in selecting spots for taking magnetic bearings, choosing a site for an observatory, or in selecting stones for the fixed stands of magnetic instruments, &c.

Quartz, both white and ferruginous, is abundant; and a white striated mineral resembling tremolite externally.

Wallavapur. This place is about thirty miles from Hospett. Below the fine anicut (dyke) thrown across the river by the Hindoo princes of Bijanugger, is seen a bed of gneiss penetrated by veins of porphyritic granite, containing much pink felspar in large semi-foliated crystals; and here and there nests of hornblende and mica. The strata of the gneiss are waved and bent.

A dyke of basaltic greenstone crosses the river bed in a westerly direction, compact at the edges: porphyritic towards the centre. The imbedded crystals are of light green felspar augite and hornblende.

Gneiss, granite, hornblende schist, and basaltic greenstone continue to Humpsagur, where the Tumbuddra is crossed, into the South Mahratta country. Rock basins. The rocks in the bed of the river, both from Bijanugger and still farther east to Humpsagur, afford many instructive examples of the formation of rock basins by the action of water in motion, particularly below the anicut of Wallavapur, where the gneiss is full of them.\* The anicut itself is a stone dam, about twenty yards broad, thrown across the river so as to dam up its course, and to throw part of its water into the fields on either bank. On stone slabs in both wings of this anicut are inscriptions in the Hala Canada character, giving the date of its construction, viz. 1443 Anno Salivahana, (about 1521 A.D.), name of Cyclar year, Vicrama; in the month Aswin. Although the floods of this large river have washed over these inscriptions for upwards of three centuries, the characters of the inscription are perfectly distinct and legible.

From Humpsagur to the Western Ghauts. From Humpsagur the river crossed into the Darwar, or South Mahratta country, the geology of which by Gudduk and Dammul to the Western Ghauts, has already been described as consisting of granite and the hypogene schists, intersected by greenstone dykes.

From Cuddapah to Darwar the Régúr prevails, interrupted only when the rising of these rocks from the surface has covered their bases with a more recent alluvium resulting from their own disintegration.

Ghauts West of Darwar. The formation of the Ghauts W. of Darwar is the same as at Gairsuppa, and their western base to the sea at Goa is partially covered, as at Honawer, by a bed of laterite. Most of the surface buildings and fortifications of Goa are constructed of this rock, and it formed the thick walls of the once tremendous dungeons of the Inquisition, now lying prostrate. The startled snake and glittering lizard glide noiselessly away, scared by the sound of man's footstep among the rank vegetation which in many places chokes up the ruins.

<sup>\*</sup> For a description of the Rock basins of the Tumbuddra, vide Proceedings Geol. Soc. for 1841-42.



On the Invention of the Armenian Alphabet. By JOHANNES AVDALL, Esq. M. A. S.

lf ancient Hellenic writers assign the palm to Cadmus for having been the inventor or introducer of the Greek letters, Haican historians of antiquity do bestow an equal distinction on St. Mesrop as the author or originator of the Armenian alphabet, the invention of which took place in the commencement of the fifth century, when this eminent divine flourished in Armenia, during the reign of Viramshapuh. Anterior to this period the Armenians used the Greek, Syriac and Persian characters. All their ecclesiastical and historical books were written in the two former, while the transactions of their courts of justice, as well as of their civil administration, were recorded in the latter.

Although it is true, as it will appear from what I shall have to state hereafter, that about a score of rude letters existed among the Armenians long before the day of St. Mesrop, yet their imperfection and consequent inutility was an insuperable bar to the cultivation of Armenian literature and to the advancement of knowledge among the sons of Haic. The disadvantage, attendant on the non-existence of a perfect and systematic alphabet, was deeply felt by the Armenian literati of that period. Lazarus Parphensis, a reputed historian of the fifth century, tells us that the books used in the national schools, were written in Syriac characters, and that the Armenian youths were, in consequence, subjected to great toil, perplexity and expense in the prosecution of their studies. The pious and the devout experienced similar difficulties in attending divine service, which was read and performed in books written in Greek or Syriac characters. This was certainly a source of great discouragement both to the pastors and the congregation, and at this the godly spirit of St. Mesrop was deeply grieved. The foregoing statement is fully borne out by the authority of Moses Chorenensis, who is justly termed the Armenian Thucydides, and is familiar to the learned of Europe by a Latin and French translation of his history of venerable antiquity. "be h վարդապետել երանելույն Մեսրովբայ , ոչ վուրը կրեր վտանգս , բանզի ին յն եր ընները օլ և Թարգմանիչ . և ենե այլ ոք հանդիպեր որ ըններ. wall are no no to there daipline I to quadhande tipte Imanda of theplat Pupquible : " " Beatus autem Mesrobes non parvam molestiam



inter docendum ex eo cepit, quod ipse cum lector, tum interpres erat, neque a populo intelligi potuit, si quis fortè, eo absente, legisset, quoniam quidem non aderat interpres." L. III. Cap. XLVII. The heart of St. Mesrop burned with a holy desire to translate the Scriptures into the Armenian language, but the want of a perfect alphabet operated as a check to the attainment of the great object he had in view. This insurmountable obstacle tended, in no small degree, to the revival of paganism in some parts of Armenia, the inhabitants of which had embraced Christianity. The mind of St. Mesrop, was, therefore, literally absorbed in the plan of systematizing and completing the Armenian alphabet, fully sensible that on the success of this important project depended the civilization and happiness of his countrymen. Moses Chorenensis, referring to the object in view, adds: « Վամ որոյ եղ 'ի մոր հնարել գտանել նշանագիրս Հայոց լեզուիս . և արկետը գանձն 'ի պեսպես ջանս` պեսպես փորձիշ բ տաժաներ։" " Atque ob eam rem rationem iniit, quemadmodum Armeniacæ linguæ characteres inveniret; qua in re dum operam poneret, variis premebatur difficultatibus." L. III. Cap. XI.VII.

St. Mesrop was eminent for his profound learning, and his knowledge of the Greek and Syriac languages. His unrivalled qualifications had obtained for him the appointment of Secretary to the King Viramshapuh. Having filled this situation for a certain time, he preferred the quiet of monastic seclusion to the bustle of public life. Urgent business induced Viramshapuh to sojourn in Mesopotamia, where the absence of his able and experienced Secretary, or of one equally competent to discharge the duties of his office, was a serious impediment to the progress of the transactions of his court. The use of Persian characters in public writings presented many difficulties. Hereupon, a priest or monk, named Abel, offered to the king to introduce Armenian letters, the prototype of which was said to be in the possession of a Syrian bishop, known by the name of Daniel. These letters are mentioned in the annals of ancient Armenian writers by the designation of Danielian characters, which, however inelegant and incomplete, were destined to be improved, systematized and completed by the genius of St. Mesrop.

It is thus evident that Armenian letters were extant prior to the fourth century, but these, like the Hebrew and Arabic alphabets, were



without vowels, the want of which rendered the existing consonants of little avail or practical utility. Koreun, another cotemporary writer, says, that the Danielian characters were considered insufficient to link syllables together, and to form words out of them. Hence these characters were allowed to sink into disuse, and in their stead, the Greek, Syriac and Persian alphabets were used by the Armenians of those days.

The Danielian characters were twenty-two, or, according to other writers, tweny-nine in number. The invention of the seven vowels, U, b, b, C, h, n, h is only ascribed by Asolik to St. Mesrop, while another historian asserts that he invented fourteen letters, of which seven were consonants, and the other seven, the foregoing vowels. Vardan, who flourished in the thirteenth century, says:-" St. Mesrop invented and introduced the Armenian alphabet, of which twenty-two letters are known by the designation of Danielian characters, which were, from time immemorial, extant among the Armenians. But these Danielian characters had become obsolete, in consequence of their being incomplete and insufficient to combine the syllables of words in the copious language of Haic. The Armenians were, therefore, obliged to content themselves with the use of the Greek, Syriac and Persian characters. St. Mesrop succeeded, by inspiration from above, in inventing fourteen letters, of which the form was seen inscribed on a stone by an invisible hand! This sacred gift he obtained on the mount Balu, as Moses had received the Divine tablets on the mount-Sinai! To this day vestiges of the stone, bearing the miraculous inscription of the letters, are visible on that spot, which is held in veneration by the Armenians." That there were Armenian letters anterior to the Christian era, was ascertained beyond a doubt during the reign of the Armenian king Leo, when coins were discovered, bearing inscriptions commemorative of the sovereignty of pagan Armenian kings. But these letters were both inelegant and imperfect, and our modern Ezra, St. Mesrop, brought them to perfection.

The fact of the existence of Armenian letters, prior to the beginning of the fifth century, is further corroborated by the testimony of foreign writers. Philostratus, who flourished during the reign of the emperor Severus, and who enjoyed the patronage of the empress Julia,



The improvement and perfection of the Armenian alphabet was immediately followed by the establishment of numerous elementary schools and colleges for the instruction of the sons of Haic in scholastic books written in their own characters. The Scriptures were also translated from the original Greek into Armenian, together with such select Greek works as were calculated to enlighten and elevate the minds of Armenian students. Thus a happy change was wrought, in the beginning of the fifth century, by the introduction of Armenian letters; and the reign of Viramshapuh, like the Augustan age, is considered as the golden era of the cultivation of Armenian literature.

The Armenian alphabet consists of thirty-eight letters, of which twenty-two existed, though in a rude form, prior to the Christian era; fourteen were invented by St. Mesrop, and two were borrowed from the Greeks in the twelfth century.

The following are their forms, names, and sounds.

Forms.				Names.	Sounds.
u	u	***		Ibe (as in tribe)	A (as in father)
R	p.	F		Bien,	, B soft.
4	4	4		Kim,	K. C. Q.
4	7	T		Tah,	T soft.
b	F	t		Yetch,	Ye (as in yes.)
2	q_	2		Zah,	Z or S soft.
þ,	1	4		E	. E (as in met.)
C	Ľ	E	1.30	Yet,	U (as in us.)
6	P	P		Twoh,	T hard.
<b>ক</b>	d	4	asall Marie	J. or Zh,	J. French, or as English S. in the words pleasure, measure.
h	1	ŧ		Inni,	I or E.
L	1	2	100	Luine,	L.
lu	fu	100	122	Khé,	Ch. German, or as X Greek.
0	8	5	19. 24	Dzah,	Dz.



The following are their forms, names, and sounds, (continued.)

Forms.			Names.		28.		Sounds.
y	4	3		Ghien,			G hard.
<b>*</b>	15	4		Hwoh,			н.
2	2	3	1	Tzah,			TZ soft.
2	7	2		Ghahd,		9.	Gh or as y Greek.
Z	2	×	**	Je or Jd	e,		I or G soft.
n.	J	S		Mien,			M.
8	J	0		He or Y	e,		H soft.
4	1	2		Noo,			N.
7.	2	2	••	Shah,		• •	Sh.
n	n			Wo,			Wo (as in worthy.)
2	٤	2		Tchah,			Tch or Ch (as in charity)
a	щ	***		Pe,	••		P.
.C.	2	2	••	Tche or	Ché,		Ch or Tch soft.
1	IL.	-	-	Rah,	• •	••	R hard (as in raft.)
U	u			Sé,	••		S.
u_	4	1	• •	. Viev,		••	V.
S	un	**		Tune,	• •		T.
r	ľ	r		Ré,			R soft.
8	9	9		Tzvoh,	• •		Tz hard.
h	L	-	-	Une,		7.20	U.
Ф	4	+		Pare,	• •		P.
R	·P	+	10.00	Ké,	• • 11		K or Ch (as in archangel.)
0	0			0,			O.
æ	· 4	4		Pha, or	Fé	• •	Ph or F.

It is worthy of notice, that a beautifully lithographed folio volume on Armenian Caligraphy was published at Venice in 1834. In this interesting publication is given a great variety of specimens of the Armenian alphabet, in nearly thirty different forms, which must certainly excite the wonder of orientalists, and the admiration of the lovers of Armenian literature. A similar publication has, it appears, lately issued from the Armenian press at Vienna, but not a single copy of it has as yet reached us in India.

CENTRAL LIBRARY

Proceedings of the Asiatic Society of Bengal, July and August, 1845.

The monthly meeting was held at the Society's Rooms on Tuesday evening, the 12th of August, at the usual hour, Charles Huffnagle, Esq. the senior member present, in the chair.

The proceedings for the month of June were read and confirmed by the meeting.

In reply to an enquiry from Capt. Marshall as to the causes of there having been no meeting in the month of July, the Secretary stated that his public duties having become, on a sudden, excessively onerous, owing to the necessary investigations connected with the extensive opium forgeries which had taken place, he had been unable to give any attention to the Society's affairs at that epoch, and thus the meeting was unavoidably postponed.

In reply to a further enquiry from Captain Marshall, as to alterations in the days of meeting, which in the rules was stated to be the first Wednesday in every month, some conversation took place, in the course of which it was satisfactorily shewn by the older members present, that from the nature of Indian, and especially of Calcutta Society, much discretionary power was necessarily, and always had been, left to the Presidents and Secretaries in calling the meetings; and further, that by the rule itself\* it was evident this had been always intended; still it was thought by the meeting that it would be generally advantageous, if the former day (the first Wednesday of the month) was reverted to, with the understanding that it was the fixed day unless reasons of importance should necessitate any variation from it.

<sup>\*</sup> Rule 9.—If any business should occur to require intermediate Meetings, they may be convened by the President, who may also, when necessary, appoint any other day of the week instead of Wednesday for the stated Meetings of the Society.

## Read the following list of books presented and purchased:

List of Books received for the Meeting of the Asiatic Society, on Tuesday, the 12th August, 1845.

#### Presented.

Meteorological Register for May and June, 1845, from the Surveyor General's Office. Oriental Christian Spectator for July, 1845.—By the Editor.

The Calcutta Christian Observer, for July and August, 1845.—By the Editor.

The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, No. 171, February 1845.—By the Editor.

Prinsep's Historical Results from Discoveries in Afghanistan, 2 copies.—By the Author-Transactions of the Society of Arts, 1843-44, vol. LV.—By the Society.

Burnouf's Bhuddisme Indien, vol. 1 .- By the Author.

The Sabda Calpa Druma, a Sanscrit Dictionary, by Rája Radhakant Deb. vol. 5.—By the Author.

Récherches Sur les Poissons Fossiles, par L. Agassiz :-1843, 17me et 18me livraisons.-By the Author.

Monographie des Poissons Fossiles du vieux grès rouge ou système Dévonien (old red sand-stone) Des iles Britanniques et de Russie, par L. Agassiz, 1er et 2d livraisons, 1844.—By the Author.

Baron Hügel's Travels in Kashmir and the Punjab, 1845.—By the Publishers.

Lithographed drawing of the evening ride of H. H. Maharaja Sheer Singh.—By Prince Soltikoff, presented by H. Torrens, Esq.

#### Purchased.

The Classical Museum, No. 1.

Ritter's Geographie, from the 2nd to the 9th vol.

Stuhr's Geschichte der Religions formen der heidnischen Volker. 2 vols.

Stuhr's Chinesische Reisehreligion. 1 vol.

North British Review for August and November, 1844, Nos. 2 and 3.

Do. Do. February and May, 1845, vols. 4 and 5.

Whewell's Philosophy of the Inductive Sciences, vols. 1 and 2.

Whewell's History of the Inductive Sciences, vols. 1, 2, and 3.

Reflections on the Politics, Intercourse and Trade of the ancient nations of Africa, by A. H. L. Heeren, vols. 1, 2, 3.

Donaldson's Varronionus.

#### Exchanged.

Journal of the Agricultural and Horticultural Society of India, Part II. vol. IV.
The Annals and Magazine of Natural History including Zoology, Botany and Geology, for May and June, 1845.

The Athenaum for April 26th, May 3rd, 10th, 17th, 24th, and 31st, and June 7th, and 14th.

Read a letter from the Secretary to the Board of Control transmitting bill of lading for the case of books presented to the Society by His Imperial Majesty The Emperor of Russia.



Read the following reply, by the Secretary, to the letter of His Excellency Count Ouvaroff, Minister of Public Instruction at St. Petersburgh.

The Minister of Public Instruction, St. Petersburgh.

I am honoured by being made the medium of communicating to your excellency the expression of the deep sense entertained by the President and Members of the Asiatic Society of Bengal of the gracious condescension of His Imperial Majesty the Emperor in viewing and deigning to direct the acknowledgment of their offering to His library in a manner so honourable and gratifying to them. The splendid medal of His Imperial Majesty will be regarded by the Society as among the most precious of the mementos which it possesses of great and distinguished men.

I am directed to forward a duplicate set of the works formerly dispatched for the Imperial library at Moscow, together with duplicate copies of two works in Arabic and Persian, published since the former dispatch.

The munificent gift of books vouchsafed by His Imperial Majesty will prove a most valuable addition to our stores of Eastern learning.

Allow me to record the expression of the pride which I must feel at finding myself the intermediate agent in so gratifying a correspondence as the present.

> H. Torrens, Vice Pres. and Sec. Asiatic Soc.

Read the following letter in reply to an offer made by the Society to furnish the Government of the North West Provinces with copies of the second map of the Nerbudda River, from Hoosungabad to Mundlaisir, by Colonel Ousely, now in the hands of the lithographers:—

No. 596.

FROM A. Shakespeare, Esq., Assistant Secretary to the Government of the N. W. P.
To Henry Torrens, Esq., President and Secy. Asiatic Society, Calcutta. Dated Agra,
the 17th July, 1845.

GENL. DEPT. N. W. P.

Sir,—I am directed to convey His Honor's thanks for the offer contained in your letter, of the 28th ultimo, and to state that he will be glad to receive 100 copies of the Map prepared by Colonel Ouseley, of the Nerbudda river, from Hoosungabad to Mundlaisir.

A. Shakespear,

Assistant Secy. to the Govt. N. W. P.

Agra, the 17th July, 1845.

Read the following letter :-

No. 811, of 1845.

FROM F. Currie, Esq., Secretary to the Government of India, To the Secretary, Asiatic Society, Fort William, the 28th March, 1845. Foreign Dept.

Sin, -I am directed by the Governor General in Council to transmit for such notice



as the Society may deem it deserving, the accompanying copy of a Journal of Lieutenant Rowlatt's Tour into the Mishmee Hills, North East of Sudiya.

J. CURRIE.

Secretary to the Government of India.

Fort William, the 28th March, 1845.

The paper was referred to the Editors of the Journal for publication. Read the following letters and papers from the Society's London Agents :-

Duplicate, Original per " Duke of Cornwall."

London, April 21, 1845.

HENRY TORRENS, Esq., V. P. and Secretary to the Asiatic Society, Calcutta. Sin,-We have the pleasure to enclose you a Bill of Lading for a case of books presented to the Asiatic Society by the Dutch Government, and which we have shipped to your address by the " Duke of Cornwall." The case was transferred from the Dutch vessel to the Duke of Cornwall without any charge being made for duty.-We beg to enclose you a memorandum of the expenses, which we shall place to the debit of our account with the Society.- We also enclose you a translation of the letter that was to accompany the Box .- The original is on very thick paper, and we shall take an opportunity of forwarding it in a parcel.

We shall be obliged by your favouring us with instructions regarding the disposal of the large stock of the Asiatic Researches received from Mr. Murray on the 5th March, 1844.-We wrote you respecting the same on the 29th February, 1844, since which time we have not sold a single volume.

W. H. ALLEN and Co.

#### Duplicate.

ASIATIC SOCIETY, CALCUTTA.

April 19th, 1845.—Case of Books received from Rotterdam addressed Henry Torrens, Esq., Freight from Rotterdam, Warehousing, Entry, Export Bond, Dock Charges, and Lighterage, for transhipment ex " Batavia" to the "Duke of Cornwall," for Calcutta, Freight and Bills of Lading for .....£3 5 0 the same, .....

W. H. ALLEN AND CO.

Duplicate, Translation.

Hague, 27th January, 1845.

No. 770-5th Division.

Some time ago I received your letter of September, 1843, enclosing a copy (in your letter you speak of two copies, but I only received one), of different works in and relating to the Arabian, Thibet, and Sanscrit languages, published by or obtainable at the Asiatic Company of Bengal, which works have been placed by the said Company at the disposal of His Majesty the King of the Netherlands.



His Majesty heard with much pleasure that these works had been sent to him, and desired me to convey to the Society his best thanks, and at the same time to say that these works have been placed in the Library of the University at Leyden, where such works are deposited.

In compliance with your request to procure for the Asiatic Society the works published here by the Government relating to Scientific pursuits, I have the honor, by the authority of His Majesty, to send you the works which are mentioned in the accompanying list; of the first one we can only send as yet the Botanical part, which is quite completed. The two other parts treat of Zoology, Geography, and Statistics, which are already very far proceeded with, but will not be ready for some time, and shall then be sent to you.

Acquitting myself of His Majesty's commands, I have to request you to communicate them to the Asiatic Society of Bengal, and remain, &c. &c.

The Minister of the Interior.

#### The list referred to is as follows :-

Lyst van werken bestemd voor de Aziatische Maatschappy van Bengalen te Calcutta.

- Verhandelingen over de Natuurlijke geschiedenis der Nederlandsche overzeesche Bezittingen. Vol. I. Kruidkunde.
- Museum Anatomicum Academiae Lugduno Batavae, descriptum af Edwardo Sandefort, vols. 1, 2, 3 et 4.
  - 3. H. A. Hamaker, Incerti auctoris liber de expugnatione Memphidis et Alexandriae.
  - 4. A. Rutgers, Historia Yemanae Sub Hasano Pascha e codice M. S. Arabico edita.
  - 5. H. E. Weyers, Prolegomena ad editionem duarum Ibn Zeidouni epistolarum.
- 6. H. E. Weyers Nieuwe Proeve om al de Arabische Letters, etc. door het gewoon Europeesch Karakter onderscheidenlyk uit te drukken.
  - 7. P. T. Veth, Liber As-Sojutii de nominibus relativis.
  - 8. P. T. Veth, pars reliqua ejusdem libri.
  - 9. T. Roorda's Abul Abbasi Amedis Tulonidarum primi vita et res gestac.
- 10. M. Hoogoliet, Prolegomena ad editionem celebratissimi Ibn Abduni poematis in luctuosum Aphtasidarum interitum.
  - 11. A. Meursinge, So-jutii liber de interpretibus korani.
  - 12. T. J. P. Valeton Taálibíi syntagma dictorum brevium et auctorum.

## Duplicate; Original per" Wellesley."

London, June 14th, 1845.

HENRY TORRENS, Esq. V. P. and Secresary to the Asiatic Society of Bengal.

SIR,—We have the pleasure to enclose you a Bill of Lading for a case to your address shipped by the "Wellesley," Captain Toller, containing a bust of B. H. Hodgson, Esq. which has been executed by Mr. Thornicroft. The Bust is considered a very fine specimen, and we trust it will give satisfaction to the members of the Society.

Mr. Thornicroft is the son-in-law of the celebrated Francis,\* and is much patronized by Her Majesty and Prince Albert.

The case has been packed with the greatest care and we have had it stowed in a secure place on board the Wellesley. We would recommend your applying for it immediately on the arrival of the vessel at Calcutta.

<sup>\*</sup> So in original. Query : Chantrey !- Ens.

CINTINAL LIBRARY

We beg to enclose an account of the cost of the Bust, and have given credit for £51 17s. 9d. as per our letter of the 2nd July, 1844, and also for £9 19s. 2d. agreeably to your letter of the 5th of October, 1844. The balance of £34 8s. 11d. can be remitted to us should you desire it kept separately from our account for the sale of the publications of the Society, which will be rendered to you by an early mail.

We are, Sir,

Your faithful servants, W. H. Allen and Co.

H. Torrens, Esq. Secretary of the Asiatic Society, Calcutta.			
1845, June 7th.—Paid for a Marble Bust of B. H. Hodgson, £	84		
" ,, Case for packing, lined with tin and packing,	1	5	0
Entry, Wharfage, Shipping Expenses, and Bills of Lading,	0	12	0
Freight and Primage, £1 2s. 6d., Insurance on £90 at 40s.			
per cent. and Policy, £1 18s	3	0	6
	88	17	6
Commission, 5 per cent.	4	- 8	10
	£93	6	4
Cr.			
July 2nd, 1844.—By Balance of our account to June 30th,			
1844, stated this date,	51	17	9
,, Amount of sale of Journal Asiatic Society			
of Bengal to No. 132 carried here as per request in the letter			
from H. Torrens, Esq. dated October 5th, 1844,	9	19	2
61 16 11			
Less paid a set of Bills drawn by you in favor of Mr. A. Bartlett, 2 19 6	58	17	5
The second supplies the second	£ 34	8	11

W. H. ALLEN AND Co.

With reference to Messrs. Allen and Co.'s wish to receive directions as to the Volumes of Transactions received from Mr. Murray, it was resolved that the Secretary be empowered to order back such number of copies of each volume as he might judge best. It was further resolved that the Society's agents be desired to give to the Researches the advantage of advertising them at proper intervals.

Read a note from Dr. Strong claiming exemption from further payment of subscription, on the ground of his having been a member for more than twenty years.

After some consideration it was settled that as no authentic record of any such resolution appeared, Dr. Strong be requested to produce some authority and ground for his claim. Read the following note from the Sub-Secretary with the letter and lists to which it refers :-

The Sub-Secretary has the honor to report that in reference to Mr. König's application and the list prepared by Dr. Roer (Proceedings of May 1845) of Sanscrit works published in Calcutta, he has, with the concurrence of the Secretary, addressed letters to various learned Hindus in Calcutta, with copies of the list, requesting them to supply any deficiencies in it. The whole having been returned with the suggestions of those gentlemen, the list is now further completed; and may, he suggests, with the addition of those works sent by the Committee of Public Education be properly printed in the Journal. He submits herewith the letter of the Committee.

HENRY TORRENS, Esq., Secretary and V. P. Asiatic Society.

Sin,—In reply to your letter dated 26th July, 1845, I am directed by the Council of Education to place at your disposal, for the purpose mentioned, the accompanying copies of the Sanscrit works indicated in your list.

The Council have no stock on hand of such books, as they have all been made over to the Library of the Sanscrit College, from which a larger number than those now sent cannot be spared. It may, therefore, perhaps, be worth the while of Mr. König to reprint such of them, as may be deemed deserving of and calculated to promote his very laudable and useful design. I am directed likewise by the Council to assure the Society that it will at all times afford them much pleasure to aid the Society in the promotion and extension of Oriental literature in every way in their power.

I have the honor to be,

Sir,

Your most obedient servant,

FRED. J. MOUAT, M. D.,

Council of Education, Aug. 9th, 1845.

Secretary:

List of Sanscrit Works, by Dr. Roer, L. A. S. and various learned Hindus; to be forwarded to Mr. König, Bookseller of Bonn.

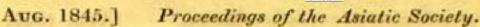
- 1. Ashtabings hati Tatwa, 2 vols.
- 2. Shánkhya prabachana bháshya, 1 vol.
- 3. Amarakósha, 1 vol.
- 4. Abhignásakuntalanátuka, 2 vols.
- 5. Chhandamanjaribrittaratnavali, 2 vols.
- 6. Sapnadhyáya, 1 vol.
- 7. Rajatarangini, 1 vol.
- 8. Abidhán, 1 vol.
- 9. Hitópadésa, 1 vol.
- 8. Sabda kalpalatika, 1 vol.
- 9. Nirnayasindhu, 1 vol.
- 10. Vivádachintámani, 1 vol.
- 11. Bijganita, I vol.
- 12. Kshétratatwadípika, 1 vol.
- 13. Satíka srimadbhágabat, 1 vol.
- 14. Satikamanu, 1 vol.



- 15. Satika bhagabadgita, 1 vol.
- 16. Satika prabódhachandródayanátaka, 1 vol.
- 17. Rudrachandi, 1 vol.
- 18. Panchapakhi, I vol.
- 19. Atrisanhita, 1 vol.
- 20. Vishnusanhita.
- 21. Haritasanhita.
- 22. Yajnavalkasanhita, I vol.
- 23. Angirasanhita, 1 vol.
- 24. Likhitasanhita, 1 vol.
- 25. Vyásasanhita, 1 vol.
- 26. Paras'arasanhita, 1 vol.
- 27. Kátyáyansanhita, 1 vol.
- 28. Vrihaspatisanhita, 1 vol.
- 29. Samwartasanhita, 1 vol.
- 30. Yamasanhita, 1 vol.
- 31. Ushnasanhita, 1 vol.
- 32. S'ankasanhita, 1 vol.
- 33. Apastambhasanhita, 1 vol.
- 34. Kámrupayátrapadhati, 1 vol.
- Vyabastháratnávali, 1 vol.
- 36. Sudrakrityabichára, 1 vol.
- 37. Yajurvédivrishótsarga, 1 vol.
- 38. Daksasanhita, 1 vol.
- 39. Mathapratishthátatwa, 1 vol.
- 40. Purushótamatatwa, 1 vol.
- 41. Chandagyvrishótsarga, 1 vol.
- 42. Dibyatatwa, 1 vol.
- 43. Vástutatwa.
- 44. Vyavahártatwa.
- 45. Udbahatatwa.
- 46. Vritatatwa.
- 47. Práyaschitatatwa.
- 48. Yajurbédis'radhatatwa.
- 49. Jótishtatwa.
- 50. Ekádas'itatwa.
- 51. Srádhatatwa.
- Débatápratishthátatwa.
- 63. Anhiktatwa.
- 54. Dáyatatwa.
- 55. Sanskáratatwa.
- 56. Tithitatwa.
- 57. Malamas'hatatwa. 57\* Gítagóbinda. 57† S'rimonmahánátaka.

Sanscrit Books, forwarded by the Council of Education.

- 58. Bháshaparichhéda and Siddhánta Muktávali, 2 copies.
- 59. Laghu Kaumudi, 1 vol.



- CENTRAL LIBRARY
- 60. Mugdhabódha, 1 vol.
- 61. Manusanhitá, 2 vols.
- 62. Mriehchhakati, 1 vol.
- 63. Mitákshara, 1 vol.
- 64. Bhatti Kávya, 2 vols.
- 65. Mudra Rákshasa.
- 66. Nyaya Sutra Vritti.
- 67. Sáhitya Darpana.
- 68. Védánta Sára.
- 69. Dáya Bhága.
- 70. Vyavahára Tatwa
- 71. Dáya Krama Sangraha, 1 vol.
- 72. Kávya Prakás'a.
- 73. Málati Mádhava.
- 74. Vikramarvasi.
- 75. Uttra Ráma Charitra.
- 76. Ratnávali.
- 77. Raghuvansa.
- 57a. Christa-Sangíttá. Second Edition.
- 57b. Parbatíyópadésá.
- 57c, Matapariksa.
- 57d. Nútnódantódótsa.

The Secretary presented also on the part of Dr. Sprenger, Principal of the Delhi College, lists of the works and translations published by the Vernacular Education Society, which were ordered to be printed and are as follows:—

# فہرست اُن اُردو کتابونکنی جو ورنیکیولر ایجوکیش سوسگتی نے چھپوائی هیں

lxxvi	Proceedings of the Asiatic Society. [Aug. 1845.
2	خلاصه التواريخ مار شمن جلد ١ و ٢
عــه	كليات قرانين ديواني ديواني
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عص	شرع شریف
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-8	اصول قوانین
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2	اصول قوانين ممالك مختلفه
28	خلاصة قوانين فوجداري
2	خلاصه قوانین دیوانی دیوانی
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عم	شمسيه ميسمش
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## کتابين جو چهپتي هين

گريمر انگريزي - ويلذد صاحبكي پولي أيكل اكونونمي - توزك قيموري - اصطلاحات آردر - مختصر قدوري - تاريخ هذدوستان تيمورس شالاعالم تك - قانون مال - تاريخ بوري و بحري - پيلي صاحبكا رساله و جود صانع حقيقي كي اثبات مين رساله آلات علم رياضي كا ديول صاحب كا - علم ادات - هرشل صاحبكا هديت - رايل عاحبكا فباتات - رساله درباب حفظ صحت كي - فلوجيا - منرو لوجيا - سنسكرت آادگ - علم جغرافيه - سرتا - حال پونسپ صاحب هذدوستان مين سنه ۱۸ ۱۳ ع سے ۱۸ ۲۳ تک - قزلباش - تاريخ هندوستان مين سنه ۱۸ ۱۳ ع سے ۱۸ ۲۳ تک - قزلباش - تاريخ رنجيت سنگه - تري ماركن صاحب كي اوصول علم حساب - علم



# تشریم - انتخاب فارسی - علاوہ آنکے بہتیری اور بھی کتابیں منظور هوئی هوئی اور آمید هی که تهور ہے عرصه میں ترجمه هو جائینگی

List of Urdoo Translations published by the Vernacular Education Society.

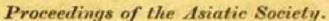
History of India,Rs.	6	0	0
Ditto of England,	4	0	0
Ditto of Bengal,	1	0	0
Ditto of Persia,	3	0	0
Ditto of Mahomedanism,	3	8	0
Marshman's Brief Survey of History, Parts 1st and 2nd,	5	0	0
Marshman's Civil Regulations,	15	0	0
Hindoo Law,	1	8	0
Mahomedan Law,	1	8	0
Mahomedan Criminal Law,	1	0	0
Mahomedan Law of Inheritance,	1	8	0
Principles of Legislation,	5	0	0
Ditto of Public Revenue,	4	0	0
Ditto of Government,	2	0	0
Ditto of the Law of Nations,	5	0	0
Assistant Magistrate's Guide,	5	0	0
Prinsep's Abstract of Civil Law,	7	0	0
Political Economy,	2	0	0
Logic or Shumseea,	1	8	0
Introduction to Natural Philosophy,	2	8	0
Arnott's Physics,	5	8	0
Principles of Practical Geometry,	1	8	0
Trigonometry, Conic Sections, &c	4	0	0
Differential and Integral Calculus,	7	0	0
Euclid, (8 Books,)	3	0	0
Algebra, (compilation by Ramchund,)	4	0	0
Shahnama,	4	0	0
Leila Mujnoo,	1	0	0
Selections from the most celebrated Hindoostance Poets,	3	0	0
Goolistan,	2	0	0
Alif Leila,	6	0	0
Urdoo Grammar, by Moulvee Imambux,	3	8	0
Ditto ditto, by Ahmud Ally,	0	8	0
Hudayakool Balaghut, (a Treatise on Rhetoric,)	1	8	0
The state of the s			

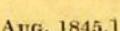
Books in the Press.

Grammar of the English language for Madrasshas. Wayland's Political Economy.

Toozuk Timooree.

Urdoo Exercises.





#### Aug. 1845.] Proceedings of

Mookhteser Koodooree.
History of India, (from Timoor to Shah Alum.)
Revenue Regulations.
Maritime and Inland Discoveries.
Paley's Natural Theology.
Simson's Mathematical Instruments.

Books under Translation.

Whewell's Mechanics. Herschell's Astronomy. Royle on the productive resources of India. A Treatise on preservation of Health. Ditto ditto on Physiology. Mineralogy, (from the Arabic.) Geology, (from Ditto.) Sanscrit Dramas. General Geography. Susruta on Medicine. Principal Transactions in India, from 1813 to 1823. The Kuzzil Bash. Life of Runjeet Sing. DeMorgan's Arithmetic. Druitt's Vademecum of Surgery. Persian Reader with Urdoo notes and vocabulary. Several other books have been accepted and will shortly be translated.

Read the following letter from Lieutenant C. B. Young, Bengal Engineers, accompanying the drawing to which it refers:—

To H. Tonnens, Esq. Secretary to the Asiatic Society.

My dear Str,—I have the pleasure to send you the drawing of the brass statue of the Hindoo deity Goorur-jee at Josecmuth. A late traveller in the Himalaya has supposed it to be of Grecian construction and representing the God Mercury. The former from its excellent workmanship may not be improbable, but it has wings neither to the head dress nor feet, nor has it a caduceus of any kind in the hands, which are joined as in the act of prayer. It corresponds with the representation of Garuda or Gurura given in Coleman's Hindu Mythology, having the wings and the hooked nose, and in addition the zennaar and ornamental parts of various kinds, as the tiara, halo, jewelled earrings, necklaces, bracelets, armlets, and anklets. The whole construction as you will see from the drawing (which is as faithfully copied in every respect as possible and without any flattery) is very far superior to the generality of Hindoo workmanship, and the whole form and expression of the statue are graceful, elegant and tasteful.

The statue is in the town of Josecmuth at the junction of the Vishnoo Gunga and Doolee rivers, and the residence of the Rawul of Buddreenath, but it does not seem to be much valued either from its sanctity or workmanship, as though the Rawul's residence

is close at hand it is left without protection of any kind, in the open air on the top of a rough structure of stones, among a few old half ruined temples.\* I did not measure its height, but it is about two feet. The general colour somewhat darker than I have made it, more weather stained and like bronze. The pedestal is cast and hollow. The left wing has been broken off and replaced crooked. The clasps of the sacred thread and of the necklace and anklets are made of the cobra's head. The whites of the eyes are silvered over. At the back of the circular halo are two iron brackets apparently for supporting a staff of some kind. In conclusion of the above, which I hope you will not think too prolix for so slight a subject, and regretting that I am not able to give you more learned particulars, I would merely add that the natives only say of it, that it has been there a very long time and originally fell from heaven.

I remain, your's faithfully,

C. B. Young, Lieut.

Almorah, July 18th, 1845.

Engineers.

P. S .- There is no writing or inscription of any kind on it.

The Secretary further stated that he had received from Major Leech, C. B. five portions of the Manuscript to the map of the Kuruk-khetra promised by that gentleman, (Proceedings June, 1845,) and that he proposed to publish it together with the map with a translation in opposite pages of the Journal.

After some conversation it was resolved that the Manuscript be referred to Dr. Hæberlin for examination and report, &c.

Read extract of a letter from Col. Ousely, Agent to the Governor General South West Frontier, to the Sub-Secretary, relative to the memoir which accompanied it, and which had been sent to the printers to appear with the map, in an early forthcoming number of the Journal.

I have the pleasure to send a memorandum, relative to the survey and map made of the Nerbudda under my superintendence, by a clever Mahratta, Ramchunder Mahadoo, of which a part was published with Mr. Shakespeare's note on the Navigation of that river, in No. 151, 1844, of the Journal.

Chota Nagpore, Aug. 2, 1845

## Read letter from Raja Radhakant Deb :-

To the Secretary of the Asiatic Society, Bengal.

DEAR SIR,—I have the pleasure to send you the 5th Volume of the S'abda Calpa Druma, and hope you will do me the favor to place it with the preceding four volumes in your Society's Library.

Your's faithfully,

4th July, 1845.

RADHAKANT.

<sup>\*</sup> The public road to Buddreenath passing along side it.

Read a note from Capt. Latter as follows :-

My DEAR SIR,—I beg to send for presentation to the Society a portion of a very interesting Boodhist sculpture, I will in a short time forward a paper illustrating it.

Your's sincerely,

THOS. LATTER.

Read notes from Major Wroughton and Col. Stacy to the Sub-Secretary:—

My DEAR PIDDINGTON,—I received the accompanying note from my friend Colonel Stacy. I send the marble Sculpture at the same time, and if you will be good enough to do with it as Colonel Stacy advises you will much oblige me. You can keep Colonel Stacy's note as a voucher that his wishes on the present occasion have been complied with.

Ballygunj, July 25th, 1845.

ROBE. WROUGHTON.

My DEAR WHOUGHTON,—Let me request you to send the White Marble Sculpture to Mr. Piddington, Assistant Secretary, Asiatic Society, begging that after the Society have satisfied themselves of its beauties, it may be placed with the rest of my property there.

The Mosque of which it formed a part is at Kella Beese, 14 marches nearly west of Kandahar. I sent down a collector for coins, and he brought me, on a subsequent trip, three camel loads of stone sculptures, one of which is the present subject, most ancient Togra Arabic with Grecian Band.

Your's sincerely,

J. STACY.

Futtyghur, 17th July, 1845.

Also the following note by the Sub-Secretary, the sculpture to which it relates being in the room:—

Supposed Buddhist sculpture from Muttra, and a stone with an Arabic Inscription, presented through Captain P. T. Cautley, by Colonel Stacy.

Read the following extract of letter from Walter Elliot, Esq. M. C. S. to the Sub-Secretary, acknowledging plans, papers, and a number of the Journal relative to the language and antiquities of Dipaldinna and Amrawatty, which have been forwarded him on the part of the Society in aid of his proposed researches in that interesting part of India:

#### To H. PIDDINGTON, Esq.

My DEAR SIR,—Allow me to return you my best thanks for the kindness with which the Society has attended to my request made through Mr. Torrens for copies of the Dipaldinny plans, and for the trouble you have further taken to send the rest of the information bearing on the subject, which must have cost you some pains and time to search out, and

for which therefore I feel the more grateful. All your communications have been safely received, the four parts of the MS. copy of Colonel McKenzie's memoirs in the Asiatic Journal, the Number of your Society's Journal with the Amrawatty Inscriptions and Alphabet, and lastly a few days ago the tin case with the plans. I am now fully armed for a campaign against the Buddhist remains at Dipaldinny and I hope in a few days to be able to go there. If I find any thing interesting I will let you know. This district is rich in Inscriptions, and I have already collected enough to afford a tolerable outline of its history from the 5th century. The successive predominance of different dynasties is very distinetly marked by the periods within which the grants made by them occur, while occasional interregna are filled up by the short-lived importance of petty local chiefs, who strutted their hour upon the stage in the plumes of royalty, bestowing lands and cows and villages with all the formality of imperial phraseology. I have been disappointed with the very meagre list of the Gujpati Kings of Orissa in Prinsep's Tables. Stirling says the lists at Juggernath are full and complete and yet he did not give them. Prinsep seems merely to have taken what he found in Stirling, and I find many names here not included in the table. The Tables in Part II. are well worth re-publishing with the additional information obtained since they were first compiled. I have got very ample materials for lists of the southern dynasties, but I defer making use of them in hopes of getting more. Many others have done the same and the whole of their labors have been lostwitness Ellis and McKenzie; I often find myself going over the same ground that they have done. Wilson sent me out three MS, folios of the catalogues only of McKenzie's Inscriptions, but the Inscriptions themselves are I suppose in the India House, where they are quite useless. Pray make my best acknowledgments to Mr. Torrens and say how much I feel obliged to him and believe me, my dear Sir,

Guntoor, June 27th, 1845.

WALTER ELLIOT.

Read the following extract from a letter from Lieut. A. Cunningham, R. E., accompanying the paper to which it refers:—

## To H. Piddington, Esq.

My DEAR SIR,—Herewith I have the pleasure to send for publication in the Journal of the Asiatic Society of Bengal, a notice of some very interesting and unpublished coins of the Indo-Scythians. I send one plate of the coins with the article, that you may be able to lay your hands upon the 600 copies of the plate which I sent down three years ago.

Gawlior, 12th June, 1845.

A. Cunningham, Lieut. Engineers.

The Presiding Member, Charles Huffnagle, Esq., exhibited to the Society the curious piece of sheet copper forming the subject of the following memorandum, on which was clearly to be read the words two foot in chalk coloured by a thin oxidation of copper, but having distinctly preserved the copper below it from further wear, as stated in the note:—



I have it in my power to exhibit a very interesting fact to the Society this evening. Through the kindness of Captain Kelloch, of the steam ship Bentinck, I now shew you piece of sheet copper taken from the steamer "Hindoostan." This copper was placed upon the ship in England, and since it was there fastened the ship has passed over about 100,000 miles. You will perceive that a chalk mark made upon the copper still remains! and the portion of copper under this chalk mark is of the original thickness, while the friction, &c., has worn away every other part of its surface. Since this interesting discovery the owners of the ship Æneas have chalked over the whole of her copper with the hope of thus preserving it.

Read the following extract of a letter from Dr. H. Walker, Surgeon to the Right Hon'ble the Governor General.

My DEAR MR. TORRENS,—I have the pleasure to send you a list of books on Zoology, &c., required for the Library of the Asiatic Society. A large proportion of these works, however, treat of science in general.

On a rough calculation, I think the cost ought not to exceed 10,000 rupees.

Many of the books are of untient date. These, the society's bookseller, should seek out in the catalogues of second-hand books, such as Bohn's, &c.

Some works I have not inserted on account of the expense, such as, Viellot and Le Valliant's Birds of Africa—also Spix and Martius's Zoology of Brazil. The list comprises complete sets of the Transactions of the principal learned Societies of Europe and America—those of the French Institute—of the Royal Academy of Sciences of Berlin—of the Academies of St. Petersburgh, Stockholm, Copenhagen, &c. It also comprises the Natural History of the voyages which have been undertaken from time to time by the Governments of Europe and America.

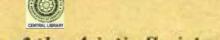
If you can obtain the sanction of the Society for the purchase of these books you will do more for the good of the Institution and for the promotion of science than has been done for a long time before in this country.

Barrackpore, 11th August, 1845.

The Secretary stated that he proposed to lay before the Society a financial statement; when the means of gradually compassing this important purchase could be discussed.

In reference to this subject the Sub-secretary stated that in vol. V. of the Society's Journal, p. 190, there was a letter printed from M. Guizot, then Minister of Public Instruction in France, formally presenting to the Society a copy of M. Jacquemont's work printed by the French Government, of which the Society had only received a few numbers. The Secretary was authorised to apply in form for the remaining ones.

The Secretary stated that he had to present a valuable paper on Revenue matters from James Alexander, Esq., C. S. which he proposed to print in an early number of the Journal.



The Secretary presented on the part of the Rev. M. Barbe, Missionary, a paper on the hill tribes in the interior of Chittagong, which he proposed to print at an early date.

REPORT OF THE CURATOR GEOLOGICAL AND MINERALOGICAL DEPARTMENT, AND MU-SEUM OF ECONOMIC GEOLOGY FOR THE MONTHS OF JUNE AND JULY.

GEOLOGICAL AND MINERALOGICAL.

We have to announce here a valuable series of eight papers on the Geology of Southern India by our indefatigable contributor Captain Newbold.

And these papers are the more valuable as they describe sections across the whole Peninsula. I need not refer Geologists and scientific men in general to this gentleman's papers already published in our Journal, that of the Royal Asiatic Society, and Madras Literary Society, to give them an idea of the value of this contribution. We are preparing the lithographic diagrams, and the papers will appear in regular succession in the Journal.

Lieut. Sherwill has also sent us a note, with two capital sketches of some very singular sandstone concretions near Sasseram, of which I have the pleasure to exhibit the lithographs, which however, though the artist's drawing was good, have become somewhat confused in the printing and by no means do justice to Lieut. Sherwill's capital pen and ink sketches.

In pursuance of the suggestion made in my report, and approved by the Society, the following letter has been addressed by our Secretary to the Private Secretary to the Right Hon'ble the Governor General. It could not be sent in before, the map having the been returned to Lieut. Sherwill to mark the heights, &c.

The Private Secretary to the Right Hon'ble the Governor General.

Srn,-I am desired by the Asiatic Society to request that you will be pleased to bring specially to the notice of the Right Hon'ble the Governor General the highly meritorious exertions of Lieut. W. S. Sherwill, 66th B. N. I. of the Revenue Survey; that gentleman having, in the intervals snatched from the very laborious duties of a Survey officer, constructed a beautiful Geological map of the province of Behar and made a valuable collection of 375 large specimens to illustrate it, together with a memoir, all of which he has placed at the disposal of the Asiatic Society, which is farther indebted to him for other communications and presentations, of minor but still of very considerable importance.

The Society believe that there is searcely any instance yet on record of a public officer adding so zealously and largely to his public duties, and so usefully advancing our scientific knowledge of the district in which he is employed, and have thus they conceive a pleasing duty to fulfil in respectfully bringing it to the notice of the Right Honorable the Governor General. Lieut. Sherwill's Geological map accompanies the present for the inspection of the Right Honorable the Governor General, after which I have to request its return.

Museum, 26th July, 1845.

H. TORRENS.

V. P. and Secretary, Asiatic Society.

And the following reply has been received :-

H. Torrens, Esq. Secretary, Asiatic Society.

SIR,-I am directed by the Governor General to acknowledge the receipt of your



letter forwarding a map constructed by Lieut. Sherwill, 66th B. N. I. which has been laid before his Excellency.

I am at the same time desired to state that the Governor General considers the map to be admirably executed, and that Licutenant Sherwill deserves great credit for devoting his leisure hours to scientific pursuits, and for presenting to the Asiatic Society the result of his exertions.

I beg to return Lieut. Sherwill's map, and to remain,

C. S. HARDINGE,

July 30th, 1845.

P. S.

On application to government we have been kindly favoured with a set of the Revenue Survey maps of the Lower Provinces as far as completed, being in all, as per accompanying list, 131 sheets. The constant references which we have to make for localities render these maps together with those of the North West Provinces formerly obtained, of much value to us.

#### MUSEUM OF ECONOMIC GEOLOGY.

We have had referred to us a specimen of (Assam?) Lignite by Messrs. Mackey, the examination of which is worth putting on record, as adding one more to those tabulated by Mr. James Prinsep, it is as follows:—

Report on a specimen of Lignite (sent as coal) for examination to the Museum of Economic Geology.

This specimen is not coal but lignite, i. e. wood reduced to carbon, and often impregnated with other matters, as iron, silex, &c. The locality whence obtained is not mentioned and I may note here that it always should be so. The clay and sandstone sent with it resemble those of Assam.

It contain	s in 100 parts.	
	Vater,	12.00
(	Carbon,	31.60
Charles 4	Volatile matter,	26.40
resident of	Ash,	29-20
	A STATE OF THE STA	99-20
Carlon Line	Loss,	80
		100.0

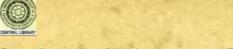
It is thus a poor ferruginous, silicified lignite, the ash being principally iron and silex, but it may, in common with many of the lignites, be a very good fuel for many purposes as where heat only or carbonaceous matter (as in smelting metals) be required, but where flame, as for steam engines is also desired it would probably be insufficient. Nothing, however, can be said on this head but from a large and proper furnace trial. It might in some cases be profitable to mix with good coal.

The lignites are in some countries of Europe used as manures both pure and burnt.

H. PIDDINGTON.

Cur. Mus. Eco. Geology.

We are indebted to Major Glover, of the Madras Engineers, for three boxes of specimens; his note of them is as follows:—



My DEAR SIR,—I have the pleasure to send you three small cases of specimens; that marked 6 is from the summit of the Sulloh mountain in Java, and the limestone therein are from the Bird's-nest caves on the Bhyt Binning estate, about seven miles from Buitenzorg. No. 15 contains specimens gathered on the Masulipatam level between that station and Vizagapatam, and No. 21 is from the vicinity of Tennivilly (Purla) in the Tanjong agency. I should have called myself, but I am too much pressed for time as the ship sails this evening.

J. C. GLOVER.

July 23rd, 1845.

Major, Madras Engineers.

And though without any further references, (which is much to be regretted,) they are still valuable and will offer a good selection. I may mention that in the Indian specimens I have found a fine ore of Manganese, of which, though the locality is not named, it may be discovered, and if near to Vizagapatam or Masulipatam, be worth exporting.

Dr. Roer has obliged us with a small specimen of the stone of which the noted pagodas of Tribenee, zillah Hooghly, are built. It is a dark basalt with abundant crystals of olivine, and so nearly resembles the stone cannon-balls from the Telliaghurry pass presented to the museum about two years ago by Mr. Gatfield, that we might suppose them to be from the same bed or dyke; and this is not impossible since the balls might well have been made at Hooghly under the Mogul Government and even from the materials of a Hindoo Pagoda.

Major Ouseley has forwarded to us a specimen of an ore, with the matrix, which was brought to him as the copper ore of the "Tamba Pahar" (copper mountain), near Suraykela, and also a bit of copper said to be made from it. This ore, however, is not copper but good magnetic iron ore; and this is the second instance in which iron ores (in the former instance a poor ferruginous silicate sent about four years ago) have been sent from that quarter as copper. I learn that the native chiefs threaten the direst punishments to those of their followers who shew the Europeans the mines, as they fear their being taken possession of by Government, as I believe is always the case under native rule. And if they really possess copper mines they no doubt derive some revenue from them.

Captain Shortrede has handed in a few small specimens of iron ores collected on his road between Jubbulpore and the banks of the Sone. They are mostly Hematites of a very fine grain and quality, and he states that they are very abundant.

We have received from Professor Zipser of Neusohl in Hungary, the following very gratifying letter which Dr. Roer has kindly translated for us:-

## To the Honourable Asiatic Society of Bengal,

"The Ausburg Universal Gazette having published a Circular from the direction of the Honourable Asiatic Society with regard to the establishment of a Museum of Economic Geology, the undersigned, in furtherance of this object, has much pleasure in offering gratis to the Society his orycto-geognostic collections of minerals of Hungary and Transylvania.

"We are, is said in that Circular, in almost entire ignorance about India and its resources, as well as about the causes, by which the progress of that country in several branches of industry, as, in mines, agriculture, &c. is so much retarded. To develope its resources, we must be assisted by every information not only respecting India, but also



Europe and America. Deprived of such information, our progress cannot be but small; on the contrary, armed with it, we may confidently hope, that the day will arrive, when the mines, quarries and the soil of India will bring to light the treasures nature has confided to them. We therefore trust, that those who are disposed to contribute to this great public undertaking, will bear in mind, that nothing, however common it may be deemed at its native place, is unimportant to us, and that no detail can be too minute, and no collection too large."

This explanation gives me the assurance to believe, that my gift will answer your expectations. I must, however, request you to direct me about the way of transmission. My collections, which contain only instructive specimens, together with an explanatory catalogue, will in parcels of a hundred be dispatched, according to opportunity and stock in hand. As I am in communication with Bremen, the collections might perhaps be forwarded to you from that place. Hoping you will soon favor me with an answer, I have the honour to be, &c.

DR. C. A. ZIPSER, Professor.

Bergstadt Neusohl in Hungary, 21st Feb. 1845.

I should suggest that in replying to it we should be authorized on our side to offer to Professor Zipser assistance from all the resourses of the Society whether scientific or literary.

H. PIDDINGTON.

For all the above communications and presentations the best thanks of the Society were awarded.



## JOURNAL

OF THE

## ASIATIC SOCIETY

OF

#### BENGAL.

EDITED BY

THE SECRETARY.

## VOL. XIV.

PART II.-JULY TO DECEMBER, 1845.

Nos. 163 to 168.

NEW SERIES.

"It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different parts of Asia will commit their observations to writing, and send them to the Asiatic Society, in Calcutta; it will languish if such communications shall be long intermitted; and will die away if they shall entirely cease."—SIR WM. JONES.

CALCUTTA:

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1845.



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اسامي كتب فتاوى عالمكيري مرتب بشش جلد في جلد هشت روپيه عنايه جلد ثاني وثالث ورابع في جلد ... هشت روييد شرائح الاسلام ... ... ... هشت روپيه انيس المشرحين ... ... پنج روپيد ... چهار روپيه جوامع علم رياضي ... ... اصطلاحات صوفية ... ... پنے روپید \* .:. خزانة العلم ... ... هشت روپيع ••• تاريخ نادري ... ... هشت روپيه ... فهرست كتب كالج فورت وليم واشياتك سوسيتي يكروپيه

## JOURNAL

OF THE

## ASIATIC SOCIETY.

On the tenures and fiscal relations of the owners, and occupants of the soil in Bengal, Behar, and Orissa. By James Alexander, Esq., B. C. S.

The word Zemindarree, in the time of the Moghuls, signified the particular extent of land over which one zemindar, or landholder, exercised jurisdiction; the collection of the revenues of that district was one of the chief duties entrusted to him, and the object of the greatest importance to the state. The amount of revenue leviable upon it became the distinguishing character of each zemindarree, and it was the only matter regarding it of which a record was kept in the superior revenue offices. Although the area was entered in some of the registers, yet the information regarding this, or as to the peculiar boundaries or products of each tenure was very defective. When the Perpetual Settlement was effected under the British Rule in Bengal, Behar and Orissa, the same form of record was preserved, and to this day little more is known of a zemindarree than the amount revenue which it is bound to pay the state. For the actual collection of revenue, and better preservation of individual rights, more particular distinctions have become necessary; but these will be more conveniently treated of under another head.

Zemindar. This officer, under the Moghul government, exercised powers as phoujdar, or chief of the armed force, collector of revenue, and civil judge in trifling cases. On the accession of the English, his

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services were required only as a middleman between the state and the actual cultivators of the soil. Although the zemindar's office had become by use hereditary, yet it is uncertain whether he had any proprietary right in the soil itself. It was, however, found convenient to bestow this right upon him, in order that it might be available as a security for the payment of the revenues of the state; and the zemindar is now regarded as the proprietor of his zemindarree as long as he makes good the Government revenue leviable from it. Should he fail to do this, his proprietary rights are liable to sale for the realization of the demand.

It was incumbent on the zemindar, in his character of collector of revenue, to account to the state for his collections; his remuneration consisted in a per centage on his collections. The title to office having been received as a right, the same rule held good with reference to these emoluments, insomuch that the incumbents of zemindarrees were held entitled to their allowances or per centage even when they declined to perform the duties of their office by undertaking to pay the amount of revenue at which it was assessed.\* These allowances so set aside were called Malikana, and averaged about ten per cent. on the gross assessment of an estate; expenses incurred in the management of an estate are either entered in the account current, and their amount deducted from the gross proceeds, or are regulated by a fixed allowance on their account: where this latter plan is adopted, they are calculated at from ten to twenty per cent. on the assessment.

The original title of the zemindar then consisted in his right to hold the lands under his jurisdiction, on condition of accounting to the state for the net proceeds after deduction of expenses and his own per centage allowances. It is evident, however, that the state had no alternative between placing implicit reliance on the accounts given in by the zemindar or testing them by an annual investigation or assessment of the lands, and that if such took place the value of the zemindarree was entirely dependent on the result. To obviate this, it was determined in the year 1790, under the local Government of Lord Cornwallis, that an assessment should be made of all estates, and that the amount so assessed should be the sum which Government

<sup>\*</sup> Shore's Minute, 18th June 1789, para. 202nd; 18th September 1789, para. 2nd.

might demand every year, and that no further demand should be made for ten years: this period of ten years was subsequently increased to perpetuity; and all estates, held under assessments so imposed, are called Perpetually Settled Estates, or Zemindarrees.

Various causes, however, have operated to prevent or impede the settlement of many zemindarrees. These are disposed of for shorter periods, and called Estates under Temporary Settlement. The condition of tenure of these is as in Perpetually Settled Estates, the payment of the Government demand; but the period of tenure is limited by that of the lease under which it is held, and at the expiration of this the estate-is open to re-assessment.

Confirmation by competent authority is essential to the validity of either a perpetual or temporary settlement.

It is evident, that when the yearly rent of a zemindarree became fixed in perpetuity, and the payment of it was the only condition of the tenure, the condition of the zemindar was materially altered; instead of being only interested to the extent of ten per cent. in the increases upon the annual proceeds of his estate, he had a right to appropriate to his own use all surplus proceeds after defraying the Government revenue. Rapid improvements took place in all properties held under this fixed assessment; the favourable returns from these, together with the lightness of the original assessment, have raised the incomes of proprietors so high, that the term Malikana is no longer applicable to the sums, which they receive in their character of zemindars. These are now designated, generally, as Proprietary Profits; they consist in the net proceeds of an estate after deducting the Government revenue and the expenses of collection, and will of course vary very much in proportion to the capabilities of an estate, and the success of the management to which it is subjected.

A talook is a subordinate tenure within the jurisdiction of a zemindarree. Talooks were of various descriptions. In some cases the talookar had obtained the fee-simple or proprietary right in lands composing their talooks, either from the zemindar or his ancestor, or directly from the state; and his title was indefeasible as long as he paid the Government dues: in others, the incumbency of the talookdar in the subordinate tenure was prior to that of the zemindar in the larger; in others, the zemindar had never any proprietary right in the lands of

the talook. In all these tenures it was ruled at the formation of the Perpetual Settlement, that the talookdars should have the privilege of entering into engagements, and paying their revenue directly to the state, and that they should be independent of the zemindar. Talooks of this class are called Independent, or \*Huzooree Talooks. In cases where the deeds under which the talook was formed only alienated the zemindar's title to collect the rents without conveying any proprietary right in the soil, or where it was evident from the form or wording of the lease that the zemindar contemplated the resumption of his title, the talook was considered dependent, and the rent of the talook was included in the assets of the zemindarree, and paid to the state through the zemindar. Under many circumstances, to be, detailed hereafter, the rent on the talook was liable to enhancement on the part of the zemindar. It was however ruled, that neither loss nor gain on the rents derived from his subordinate tenures, could affect the amount of rent payable by the zemindar to the state. The rents of talooks were either increased or diminished, or new talooks were established at his own risk; and the civil court was in all cases the arbiter of his title to interfere with his talookdars. + With reference to the establishment of new talooks, it was laid down that he could not alienate lands for a period extending beyond that of his own incumbency; that this being conditional on the payment of Government revenue, any failure in this payment would render void his own title, and also that of all other tenants holding immediately under himself. The effect of this rule is, that on an estate being sold by auction for arrears of rent, all leases granted by the former proprietor since the Decennial Settlement become void, and the lessees liable to an enhancement of their rents under certain restrictions, which will be more fully specified hereafter.

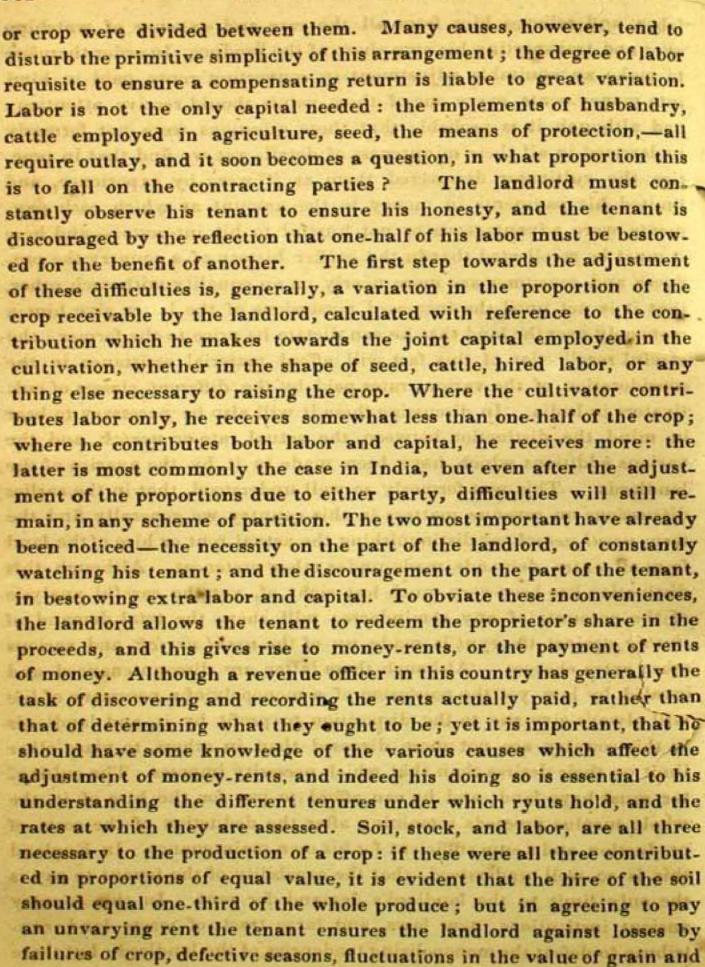
The cultivators of the soil in India have acquired various titles and privileges, acquaintance with which is essential to understanding the revenue system. Indiscriminate use of terms has given this part of the

The word Huzoor signifying literally, the presence, is applied in India to designate the extant supreme authority in the land. The addition of a vowel affix gives it the form of an adjective, and thus a Huzooree Talook comes to mean a tenure having directly to do with the Supreme Government without intermediate lien, or intervention .- Eps.

<sup>†</sup> Clause 8, Section 15, Regulation VII. 1799.

question some appearance of intricacy: to obviate this, a mere detail of the titles will be given in this place, and the privileges obtained under those titles will be more fully considered when the rates of rent are discussed; for it is evident, that in the ryuttee as in the zemindarree tenure, the rent which it will yield is the distinguishing mark of each sort of tenure, and the only point about it to which interest attaches in a discussion on revenue laws. The exact meaning of the word ryut is not conveyed by the word cultivator; for a man may be a ryut without being a cultivator: neither is the word resident a proper translation, for a man may be a resident without being a ryut. By the word ryut is implied a certain relation towards the community of the village of which a man is a ryut, and towards the zemindar of that village. An artificer or shopkeeper may stand in these relations of citizenship and vassalage, although perfectly unconnected with the cultivation of the lands of a village: in pursuing his occupation or trade in another part of the country he will still call himself the ryut of the particular village, and the particular zemindar with which he is connected as a ryut. When he dissolves this connection and becomes the ryut of another village, his rank and title in his new location are completely changed. This discussion appears necessary, because it is not uncommon to observe great misuse of the word ryut, as a revenue term; whereas it is not, until connected with some other word implying employment in culture, that it acquires any value at all. Thus the terms kudeemee or morousee ryut do not imply a ryut possessed of any peculiar privileges, merely that his ancestors were ryuts in the village, even a moccurreree ryut may hold only the area of his homestead, and these are the most common sort of moccurrereedars. The proper definitions and distinctions are khod. khasht, pace-khasht, moccurreree knod-khasht, morousee khod-khasht, kudeemee khod-khasht, moccurreree pace-khasht, morousee pace-khasht, hudeemee pace-khasht. . The several privileges which these various titles confer, will be discussed under the head of Rates. It will be necessary to observe, that the term jote is the word which may be most conveniently employed in expressing the land held by each particular ryut.

The rent of land is the hire paid for the use of it. The original contract was very much this;-the proprietor of the soil gave the use of it, and the cultivator gave his labor, and the proceeds





labor, and relieves him from all the care and expense of watching over and transporting his own share of the produce. In order therefore to make an equitable adjustment in converting rents paid in kind into money-rents, every one of these points should receive attention; and although it is probable that these questions were not formerly understood in all their minuteness of detail, yet we find that in practice the cultivator discovered them as it were by experience, and limited his payments in money to the amount at which cash payments were advantageous or not hurtful to his interests:-and here it must be recollected that in the earlier history of a country the producer and consumer are more nearly on an equality with each other, that it is not until the increased possessions of the latter give him a monopoly over the land that he can dictate its price to the former; the careful recollection of this fact will afford material assistance in the consideration of the various rates paid by the different classes of cultivators in India. In discussing these it will also be necessary to bear in mind the distinction between the actual rate or nerick, and the various additions which have been made to it by the avarice of the landlords. This was formerly so well understood, that in the earlier discussions on revenue matters in this country we generally find the term ussul nerick, as distinguishing the actual rent or hire of the land from all extra demands made under other pretences. Although this distinction has been very much lost sight of, yet the careful analysis of the accounts of any zemindarree will shew the total demand of dustur against the ryut is made up of the usstel nerick, and various other extra charges. Although these latter are discountenanced and invalid by law, yet the possession of a monopoly of a necessary of life will always give rise to the disposition to profit by it, and landlords in this country are not more disposed than in others, to place other limit on their desires than that which necessity imposes. The cultivator must have land, and he can afford to pay for the hire of it, the whole surplus proceeds remaining after the deduction of the costs of production, and a sum sufficient for his own maintenance. In England this is so well understood, that the capability of the tenant to pay is the only limit to the landlord's demand for rent. In this country ancient institutions, new laws, and large tracts of waste land, contribute to defeat the monopolizing tendencies of the landlord; but there is a constant struggle between himself and his tenantry regarding



the share which they are respectively to enjoy of the surplus profits of cultivation. In England there being no general laws for the protection of the tenantry, many landholders have at different times purchased peculiar privileges from their landlords, which have descended from father to son, and are in force to this day; the effective conditions of the judicial institutions rendering any attempt on the part of the landlord to set them aside, useless. The general laws in this country are well calculated to preserve to the cultivators all privileges, which ancient institutions or prescription without any special purchase or individual guarantee have conferred upon them; but various causes have prevented their taking advantage of the protection of these laws. Now, however the necessity of obedience of the law and executive power is becoming daily more apparent, and exactly in proportion as these assert and maintain their authority well, the peculiar privileges of the cultivator receive protection: hence also careful examination of them with a view of understanding what they are, becomes daily more interesting and important; as the nerick or rate of rent may be considered the index, or as it were test of the value of these privileges, they will come most conveniently under consideration in a review of the various sorts of rates which prevail in this country.

Nerick moccurreree.\* A fixed rate of payment secured to the cultivator under the guarantee of a written document; it is essential to the validity of tenure at a moccurreree nerick, that the land had been held at fixed rates twelve years previous to the Decennial Settlement, that the payments should have been uninterrupted and uniform. Any failure of payment renders the lease void, and proof of increase of payments on former occasions is generally regarded as evidence, that the moccurreree tenure has been broken up. Moccurreree nericks established by zemindars, at any date less than twelve years before the Permanent Settlement, are liable to be broken up on the sale of the estate for arrears of revenue, unless granted for specific purposes, or proved not liable to increased assessment on the grounds stated in Sect. 51, Reg. VIII. 1793.

Leases conveying moccurreree rights need not necessarily specify the rate of rent: they frequently record the total area and total rent, or

<sup>\*</sup> Sudder Dewanny Reports, Vol. I. page 102, "as no mention of a moccurreree tenure occurred in an authentic document."

1845.]

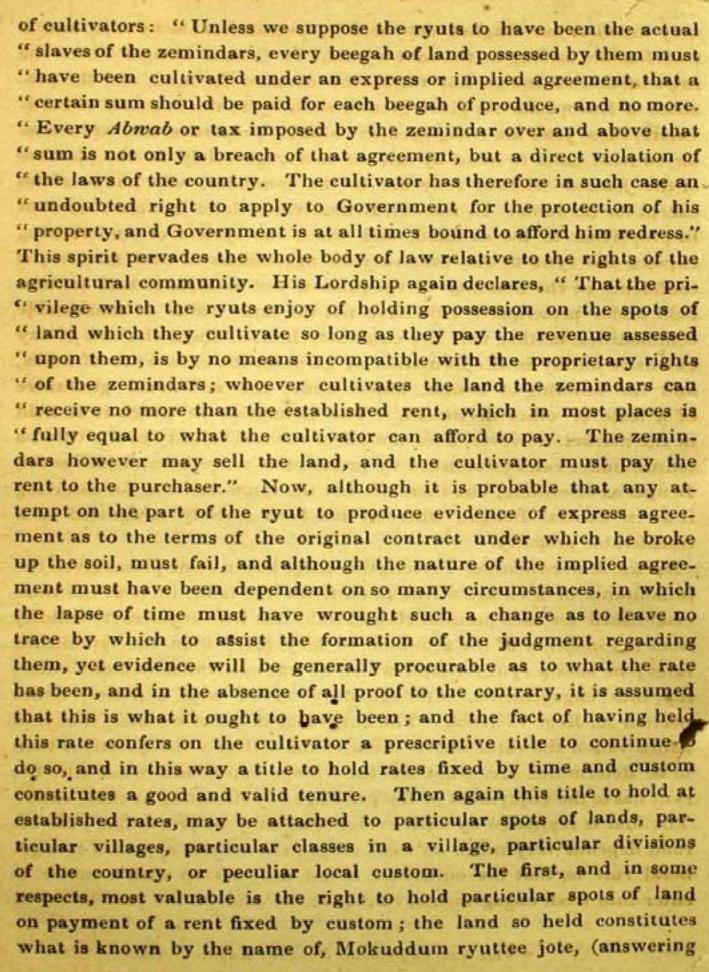


describe the external boundaries of the land, and mention the rent to be paid by the tenant; but documents of this sort will generally be found to bear dates antecedent to that of the Decennial Settlement; since then the practice of giving moccurreree leases, except for special purposes such as the erection of buildings, &c., has fallen very much into disuse; where the grants have been made for specific purposes at fair rates, they are not liable to enhancement as long as the lands continue to be used for the purposes specified in the leases. These points are specified very clearly in Sect. 27, Reg. XII. 1841.

The right to cancel a moccurreree tenure does not convey any title to oust the moccurrereedar, but merely to assess his land at the discretion of the purchaser, who still retains his right of tenancy. (Vide Sudder Dewany Adawlut, vol. 1, 174.) It must be borne in mind, that the date of the Permanent Settlement is that on which each particular settlement received confirmation from competent authority. Although in the majority of cases this occurred on the same day with reference to properties situated in the same tract of country, yet enquiry on this point is always necessary inasmuch as there are many exceptions to the rate.

Nerick Mowroosee. Fixed rates to which a title is established by inheritance. Although the term Meeras is commonly employed to denominate tenures at a fixed rent; yet taken by itself it conveys a title of very uncertain value, the heritage must consist of something to be inherited. If this be a lease guaranteed to the descendants of the lessee, the tenures should be more properly considered under the head of Moccurreree, if it be a prescriptive title it should be considered under that head; it is possible that there may be an attempt to found a title on the fact of a series of undisturbed successions, the didence to this, if not that of documents in the hands of the claimant must be obtained from the public records, or those of the zemindar; or it may be oral evidence assisted by tradition, but so many difficulties lie in the way of this sort of proof, that a Meeras will generally, as before remarked, prove a poor tenure unless supported by documents or prescription.

Nerick-i-kudeem. Fixed rates to which a title is established by prescription. The nobleman, under whose auspices the Permanent Settlement was completed, recorded the following observation on the right



very much to our English copyhold \*) is transferable by sale, and is undefeasible as long as the rent is paid. In Central Bengal where the introduction of Indigo has raised the demand for land, and the presence of Europeans has given greater stability to the interests of cultivators, these jotes are recognized as valuable properties, and are transferred from hand to hand by sale or mortgage solely at the pleasure of the jotedar without reference to the zemindar, who has no claim except for his rents. In Eastern Bengal where land is more abundant in proportion to the demand, and where the system of underletting exposes the ryut to the ever varying aggressions of new farmers, if confidence in the stability of the rates is not so strong, and tenures held under prescriptive title have not the same value as marketable commodities, neither will the cultivator himself incur the risk of any extensive outlay in the formation of gardens, the excavation of tanks, and the building of houses, unless under the additional guarantee of a lease or other document. The estimation in which it is held in the market, however, does not affect the real validity of the title; a tenure under rates established by prescriptive usage is valid in Eastern Bengal as elsewhere, but there are not the same facilities for asserting it as in Central Bengal, where it has been already recognized as a transferable property.

Nerick Monza-waree. Prescriptive usage has in some places given the inhabitants of a village a title to cultivate the lands in it at the rates established for each peculiar class of soil; this title acquires its validity from the inability of the zemindar to levy more than the established rates; he sues a ryut for land which he has cultivated without entering into engagements, although duly served with a notice, under Section X. Reg. V. 1812. The cultivator in defence states, that that notice raised the rates above those of the village; the questions then to be determined are, what are the village rates, and what title the ryut has to the enjoyment of the privilege of cultivating at those rates? The first is regulated by such evidence as may be procurable; the second depends very much on local usage; the nearest approach to a general rule is, that the cultivator if not duly served with a notice to enter into fresh engagements, cannot at the end of the year be called

on to pay more than he paid the two preceding years, and that a cultivation of two years' standing is necessary to give him a title to cultivate at the village rates. There is an apparent difficulty, as to whether the cultivation must be of the same spot, or whether the title holds good in the event of any change, but the fact in practice is, that cultivators will never break up new or even fallow soil except at reduced rates: so that the question generally arises in the third year of cultivation, when, the particular spot of land in dispute having become a valuable holding, the zemindar wishes either to dispossess the tenant and let his land to another at increased rates, or to obtain those increased rates from the occupant, who then, in the absence of other title, claims to hold at the same rate as other cultivators in the village, or at the village rates.

The Nerick-i-Mukuddum is a rate established in favor of particular individuals, who claim to hold land at rates below those of the village, as a privilege of caste or office; where there is sufficient evidence to prove that this title has been previously recognised, it acquires a force from prescription which is not easily set aside, but it has been generally conceded by the zemindar rather than admitted by Government, or the Courts; but still in practice it will be found, where there are Rajpoots in the same village with Goallas, Keorás, and Chamars or other low-caste men, that they hold their lands on more favorable terms than these latter; the alleged reason is, that the Rajpoot cultivator is compelled to employ servants, who see the whole of the labor is performed by the lower caste cultivators with their own hands. It has already been remarked, that this title must be recognised with caution.

The Pergunnah-waree Nerick is resorted to, to check the Mowzawarree Nerick in cases where the latter cannot be determined by evidence, or when the proper assessment of a village hitherto held at an inadequate rent requires re-adjustment. It is the prevailing rate in the pergunnah, a well known revenue division of the country.

The Bundoobustee Nerick is the rate recorded by an officer deputed under Reg. VIII. 1822, to effect the settlement of an estate as the proper Nerick of the place; it ought to be either a mere record of the prevailing rates fixed with reference to the various titles under which the different cultivators hold their land, or of the rates determined by

himself with due reference to the prevailing pergunnah rates. Rates thus established are under the provisions of Section XI. Reg. VII. 1822, fixed for ever, as far as concerns the ryut holding under them at the time of settlement; neither can this in propriety be questioned in the Civil Court.

Jungle-booree Nerick. The rate at which cultivators enter into engagements to bring jungly land into cultivation. These of course depend on the terms of the specific contract entered into. It may be useful to notice the various circumstances which may affect this. These are, the density of the jungle required to be cleared, the situation of the land with reference to markets, public thoroughfares or rivers, the demand for land in the neighbourhood, the means of irrigation, the quality of the soil and water, the aspect of the ground, and the healthiness of the climate.

Nayabadee Nerick. The rate at which cultivators enter into engagements to bring waste lands into cultivation; the above remarks are very much applicable to it also.

Bheetee Nerick is the rate at which land for building is let. It is generally fixed on each house, and is determined by the eligibility of site, the extent of population, and similar causes; in almost every case former payments will be the only satisfactory evidence regarding this

Nerick Baghan, Nerick Phulkur. These two rates appertaining to orchards or gardens may be considered together. As some outlay is necessary for the preparation of a garden, the cultivator generally secures himself by obtaining a lease of the ground beforehand; where he fails to do this, and has no prescriptive rights in his favor, the zemindar claims some proportion of the produce; even where this is as low as one-fifth, it is disadvantageous to the ryut, as orchard land requires great care in cultivation, and yields exceedingly high returns. A grove of mango trees standing on five acres will yield four or five hundred rupees if situated near a public road; in like way the produce of betel gardens, or pawn gardens, is of such value that the highest rate of money rent, will seldom equal more than one-twentieth or twenty-fifth part of the assets. With all these rates the evidence of past payments, or the payments in adjoining fields or properties is the best guide for determining what ought to be paid in each particular case; where evidence on this head is not procurable, great caution must be

exercised in calculating a money rent from an estimate of raw produce. It will be of importance to ascertain from evidence what proportion of this produce local custom assigns to the zemindar, and then carefully to bear in mind the fluctuations of markets, seasons, price, and other points before noticed in the discussion on money rents.

Nerick-i-Deh. In parts of the country where the villages are built in rows or streets, and the houses clustered together, the value of all lands is somewhat affected by their degree of proximity to the village, but the fields in the immediate vicinity of the houses are of peculiar value from the facility with which they are guarded, and the opportunity afforded of irrigating these from the village wells. These are called Deh lands, and are devoted to the more valuable crops, poppy, spices, tobacco, sugar-cane, and all others which require irrigation and watching. The rates on these are proportionate to the advantages conferred by position, and will generally be found recorded in the village accounts; where these are not procurable, nor appear trustworthy, evidence of former payments on cultivators of similar land will afford some guide as to what the rates ought to be. In adjusting a money rate, reference must be had to the amount of labor bestowed in raising and gathering the crop, more particularly the latter, when it consists of opium or spices.

Nerick Mutcherfa. In Behar, the cultivating classes do not pay ground rent for the spaces occupied by their houses; this however is levied from artizans, and shopkeepers and other residents not cultivators, under the head of Mutcherfa. In Bengal the word Chandnee is more commonly used for this peculiar class of rent; local usage, village accounts, and evidence of past payments, will afford the best guide in deciding claims regarding this rent. In adjusting a money rent, it is necessary to consider what are the advantages obtained, and what is included in the rent, such as a right of wharfage on the banks of a River, of frontage in a Bazaar, or of participation in the commercial privileges of the place in a large town; all which will affect the rent materially, and will, under peculiar circumstances, raise it to nearly 500 or 1,000 per acre.

Nerick-i-Bhatai, is the rate or proportion at which the rents of land are levied in kind. Where the simple word Bhatai is used, the produce is usually divided into two equal shares, of which one is

appropriated by the tenant, the other by the landlord; it is occasionally, however, levied in other proportions, such as one-fifth and four-fifths, two-fifths and three-fifths, one-third and two-thirds, or such other proportions as may be determined on.

Nerick-i-kutnee. This is rather a legal term than an absolute rate. Where disagreement exists as to the terms of divisions, or when the landlord neglects to assess the standing crop, the cultivator cuts it at his own risk, and if he fail to satisfy the landholder, the latter brings an action at the Nerick-i-kutnee, stating that the crop having been cut he had no means of assessing it, and therefore sued the cultivation at the full value of an average crop; this value is generally laid at twenty maunds per beegah of the standard of Akbur. It becomes necessary to determine through whose neglect no assessment was made, what the terms of cultivation were, what the actual produce was, what the Bazaar rates were at the time of cutting, and what the expenses were; the titles advanced by the cultivators may be just the same as in the case of money rents, evidence of the same nature may be resorted to.

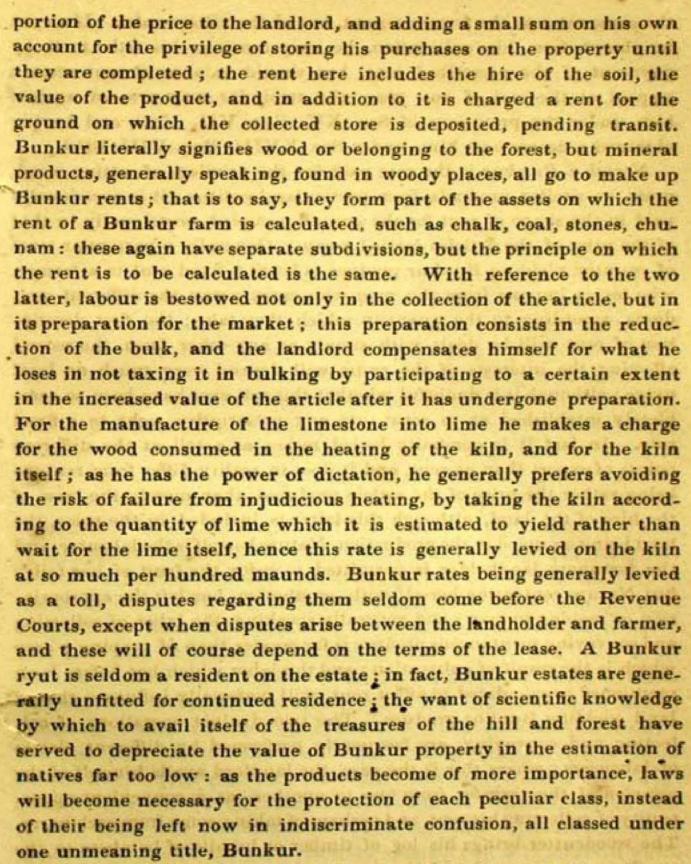
Nerick-i-kunkoot. This again is a legal term. The landlord in order to save the expense of watching the crop from the time of its cutting to its being thrashed, assesses it when standing, obtains from the cultivator an acknowledgment of the assessment mutually agreed on, and by this the accounts are subsequently adjusted. Where disputes subsequently arise regarding this, an action is brought, Kunkoot ke nerick se, or Kunkoot ke hisáb se, to determine what the assessment was, or ought to have been; if no written acknowledgment was entered into, or if it is disputed, oral evidence regarding the particular crop or tirose round it is generally all that is procurable.

Nerick-i-khaneh shumarree. Where cultivation extends over hills or places not easily accessible for purposes of assessment, revenue is assessed on the families or the males of each family; this mode of taxation is rapidly disappearing. It may be observed here, that tenures which lapse by dereliction or through default of heirs, revert to the zemindar; if a cultivator dies heirless, the zemindar may dispose of his tenure to the best advantage to himself, but if a new cultivator obtain possession without any stipulations as to rent, and retain it for two years, he cannot be ousted, but his title is not to hold the land at



the same rates as the former tenant, but at the village rates. If a ryut be absent from his cultivation, he may continue his title to it by payment of the prescribed rent, but should balance of rent remain unpaid at the end of any year, the zemindar may proceed against him under the provisions of Sec. XV. Reg. VII. 1799, and having obtained a decree oust him, under Sec. XVIII. Reg. VIII. 1819.

Nerick-i-Bunkur is the rate paid for the privilege of cutting wood, grass, or similar products from particular localities; it is occasionally paid in the shape of rent for the ground occupied, occasionally in that of the price of the articles carried away. Generally a particular tract of country yielding Bunkur produce is let at a fixed rent to a farmer, who levies imposts from the men who carry away the different products, according to the quantity which they take; the first description of rent will be dealt with simply as any other farm, the second affecting the interests of the ryuts will depend very much on local usage; although it is doubtful whether this can ever have been so completely established as to constitute any prescriptive right to a fixed rate. In fact it is generally levied rather as a toll at the different points of export than as rent, and it does in reality differ from rent, as being rather the price of the article produced, than merely the lease of the hire of the land, although this latter is included in the price, the land being occupied in the production. Nature herself is the labourer, and the fortunate landholder is permitted to enjoy the fruit of her toils; but Nature contenting herself with production, has left the appropriation or reaping to man; and generally speaking, the labor of collecting and conveying spontaneous produce is far greater than of reaping a crop which is the result of cultivation; and this labor which has before been mentioned as calculated to affect rent, will materially influence that of land yielding Bunkur produce. The two distinct operations of collecting and conveying, are frequently performed by different classes of labourers; where this is the case, the landlord avails himself of the occasion of the transfer from one to another, as a convenient opportunity of collecting his rent, and perhaps of taking some from each party. The woodcutter brings his log of timber or bundle of bamboos to the purchaser at the outlet of the estate, whatever it may be, the ghat or pass in a mountainous country, the river or roadside in a forest, or an alluvial chur; the purchaser takes it from each individual paying some



Nerick-i-churhaie, the rate of rent paid for the right of pasturage in extensive forests on waste lands. Trials will come before the Revenue Courts, rather regarding the right to levy, than the rate



at which the levy is to be made. In deciding cases, care must be taken lest the plaint, and the whole proceedings be fictitious, and lest there be collusion, the object being to establish a title by obtaining proof of having collected, or having been declared entitled to collect, or with a view of evading the resumption laws.

Nerick-i-julker, is the rate of rent paid for the right of fishery in particular waters; it is levied generally at so much a boat, and is modified according to the description of net used. Local usages prevail with reference to this rent, differing in almost every river, and every bend of each river; but litigation is less frequent with reference to these than perhaps any other class of rents.

Engagements to cultivate under a lease become void with the expiry of the lease itself; but if the zemindar instead of ousting the ryut at once, serve him a notice for the enhancement of his rents under the provisions of Reg. V. 1812, the service of the notice brings the case under the jurisdiction of the Revenue Courts, and if a balance remain unpaid at the end of the year, the zemindar cannot plead this balance as giving him a right to oust the cultivator under the provisions of Section X. Reg. IV. 1840, before the Magistrate; but having brought himself under jurisdiction of the Revenue Court, must sue for it and obtain a decree under Section XVIII. Reg. VIII. 1819. The occupancy for the year without opposition by the zemindar would appear to give the tenant a title from sufferance, which is defined by Blackstone: "Where one comes into possession of land by a lawful title, but keeps it afterwards without any title at all, as if a man takes a lease for a year, and after a year is expired continues to hold the premises without any fresh lease from the owner of the estate:" and the reason is, because the tenant being once in by a lawful title, the law (which presumes no man in the wrong) supposes him to continue upon a title equally lawful, until the owner of the land prove it to be wrongful. Now the Magistrate can only support the zemindar in the exercise of undoubted rights; he by his own neglect suffered a certain cause for doubt to supervene, and must clear it away by suing for any balance of rent as by his notice may remain due at the end of the year; at the end of the second year the cultivator has acquired a title of settlement since the expiration of his lease.



A resident cultivator considering himself aggrieved by ejectment, has a right to a trial of his grievance. If the ejectment be accompanied with violence he may apply for redress to the Magistrate, who besides inquiring into the violence, will on plaint being made under Reg. IV. 1840, call on the zemindar to prove his claim to the exercise of the right of summary ejectment, and should it appear that the cultivator had no claim, he will permit his summary ejectment; but should the case appear to be of the nature of those above described, he will either maintain the cultivator in possession, or stay the zemindar from disposing of the lands for a fixed period, within which he will instruct the cultivator to bring an action to try the ejectment under the 5th clause, Section XVIII. Reg. VIII. 1819, and the construction put upon it by the Circular Orders of the Dewannee Adawlut, dated 15th November 1833, which states that, "The declaration that it is illegal to oust resident cultivators except under circumstances, necessarily implies a remedy in case of the contravention of the rule, &c. &c."

The general laws of the country, if fully enforced, afford a degree of protection to the cultivator which is rather weakened than strengthened by a special contract or lease; even in the formation of new settlements the cultivators will be found unwilling to enter into written engagements, they have a sort of instinctive feeling that it is not their interest to do so; and they dislike the signature of the counterpart of a lease, which renders obligatory on them the annual payment of sums for the realization of which they have no security but the crop dependent on the contingencies of the season: in settlements besides the general laws of the country in their favour, they have the special protection afforded by Section XI. Reg. VII. 1822, and are well aware that if unable to assert their privileges under those general laws, that the mere possession of a pottah will not render them much stronger, but will have very much the effect of a special bond for a portion of a debt, which without affording any additional guarantee for the payment of the amount included in it, serves to throw doubt on the remainder which is excluded, and will tend to deprive them of the benefit of the protection to be derived from the general law with regard to any privileges not enumerated in it.

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Notices and Descriptions of various New or Little Known Species of Birds. By Ed. Blyth, Curator of the Asiatic Society's Museum. [Continued from p. 212, ante.]

After the first part of this article was consigned to the press, an opportunity occurred of looking over Gould's magnificent 'Birds of Australia,' up to the nineteenth number of that work; and a few of the notes I took from it, bearing on the Ornithology of India, may here be introduced.

Among the Falconidæ, a second species of my genus Butaëtus\* (ante, p. 174,) occurs in the Aguila morphnoides, Gould, P. Z. S. 1840, p. 161; and the slight enlargement and elongation of the central occipital feathers recurs in it, which I mentioned to exist in fine specimens of B. pennatus. Falco hypoleucos, Gould, (ibid.), which that naturalist considers to be the Australian representative of the Jer Falcon of the north, is very closely allied to F. juggur of India, from which it only appears to differ in having a dark forehead, no trace of supercilium, and the broadly white patch on the cheeks greatly diminished. Milvus affinis, Gould, the common Kite of Australia generally, excepting Van Diemen's Land, appears to be quite identical with M. govinda of India; but in that case the cere and feet are coloured too deeply: I can perceive no other difference whatever. Elanus axillaris (v. notatus, Gould,) is certainly distinct from E. melanopterus of India; and a beautiful new species is figured as E. scriptus. I am also informed by Mr. Strickland, that the American E. dispar has the tail wholly white, and a smaller beak than E. melanopterus: so that four species of this generic form are now established. A South African specimen of E. melanopterus, in first plumage, presented to the Society by Lord Arthur Hay, appears to me to be identical with the bird of India, although his lordship inclines to a different opinion.

In the Athene strenua, Gould, we have an Owl of the largest size, yet strictly pertaining to this genus of (generally) very diminutive Owls: and the Athene? connivens, (Lath.) Gould, Ath. maculata, (V.

This name must yield to Hieraëtus of Kaup (1844); which I learn from Mr. G. R. Gray's extremely useful illustrated work on the genera of birds, seventeen numbers of which are now before me, and from these I shall have occasion to append some notes to the present paper. Mr. Gray merges Hieraëtus in Aquila.



and H.), and Ath. boobook, (Lath.), evidently pertain to Mr. Hodg-son's genus Ninox.\*

Caprimulgus macrurus, Horsfield, is figured as an inhabitant of Port Essington, in North Australia; and the species would seem to be the same as that which I have referred to macrurus, p. 206, ante: the general colour, however, would appear to be scarcely so dark as in the Malacca specimens, and I do not understand the second white mark represented upon the breast of the male. The two sexes are figured, both having the white marks on the wings and tail, but diminished in extent in the female: and looking to a series of specimens of the nearly allied C. albonotatus, it would seem that the females vary in this respect, many having certainly more or less of this white, which confirms Captain Tickell's statement of the sexes of this bird resembling each other. In the common small C. asiaticus of India, the male and female appear always to resemble; and I now suspect that this will prove to be not unusually the case in C. albonotatus, C. macrurus, and C. mahrattensis.†

To the genus Collocalia, Mr. Gould erroneously refers two species of true Swallow, allied in nidification as well as plumage to Hirundo capensis and H. daurica (v. erythropygia); and a third Swallow is figured by him as H. neoxena, which appears to me perfectly identical with a specimen of H. pacifica, (v. domicola, Jerdon,) from the Neilgherries. A new Cypseline genus—Atticora—is founded on Hirundo fasciata, Gm., and two or three other South American species, to which is added one Australian representative as At. leucosternon.‡

\* This group Ninox is not admitted by Mr. G. R. Gray, who refers as many as forty-four species to Athene! I certainly consider the former to be a good division.

Mr. G. R. Gray refers Atticora to the Swallow group; but I have little doubt that he is wrong. Not only is the whole appearance of Mr. Gould's figure of At. leucos-

the Lower Bengal as I formerly supposed; inasmuch as specimens may be often procured in the Calcutta Botanic Garden. C. monticolus will also probably turn out to be far from scarce when I come to discover its proper haunts, which I suspect are upon open ground. The only two specimens of the latter which I have obtained were both caught alive by bazar shikarrees. Among Sir A. Burnes's drawings is a figure of a species, (from "Lakat,") nearly allied to C. monticolus, but still more uniform in its colouring which approaches to sandy,—this being a tolerably sure indication of the prevalent hue of its haunts;—but if correctly figured, (and it is stated to be "natural size,") it would be a smaller bird than C. monticolus, having the wing but nine inches and a quarter long. A skull and feet in Burnes's collection are, however, quite undistinguishable from those of C. monticolus.—The Society has just received another closely allied species from Java.



Acanthylis caudacuta (v. australis), p. 211 and note, ante, would seem identical with the Himaiayan species, only the middle of the back is represented scarcely whitish enough, and the Australian bird is figured to have a white mark above the bill, which does not exist in the Society's Himalayan specimens: but as the nearly allied Ac. gigantea varies in this respect, as shewn by specimens in the Society's museum, it is evident that no importance can be attached to this slight difference.\*

Cypselus pacificus, (Lath., v. australis, Gould,) p. 212 ante, from Penang, accords minutely with Mr. Gould's figure of an Australian specimen (except that the chin is not so purely white), and it may therefore be considered as rightly determined.

The Totanus glottoides, Vigors, is still regarded by Mr. Gould as distinct from T. glottis, and is figured by him as Australian: so also is Coturnix chinensis, which is common in parts of India, and seems to be found through all the intervening countries into Australia; and Mr. Gould admits it doubtfully into his Australian genus Synoicus. To Hiaticula nigrifrons, (Cuv.), v. melanops, (Vieillot), must be referred the Charadrius russatus of Jerdon. Hæmatopus longirostris of ternon quite Cypseline, but he has distinctly represented ten tail-feathers, of very Cypseline character: whereas all the species of the Swallow group have invariably twelve tail-feathers.

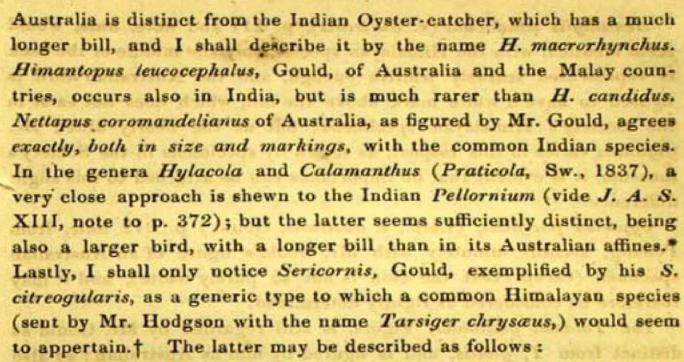
Hirundo neoxena Mr. Gray identifies with H. javanica of Vigors and Horsfield, referring them both to H. pacifica of Latham; and H. domicola, Jerdon, will come in as another synonyme: but H. jewan of Sykes is considered by him to be the true H. javanica of Sparrman, though I suspect its true name will be H. gutturalis, Scop., v. panayana, Lath.; an identification I owe to Prof. Behn. Mr. Gray agrees with me (I may even say as a matter of course) in referring Mr. Gould's two supposed

species of Collocalia to true Hirundo.

Of Collocalia, Mr. Gray enumerates four species, viz. C. esculenta, (Lin.), C. nidifica, (Lath.), C. fuciphaga, (Themb.), and C. troglodytes, G. R. Gray, which last he has figured. The Nicobar species which I referred to C. esculenta, appears to be the fuciphaga of Dr. Horsfield's list, but not of Shaw; the latter approaches much nearer to C. concolor, (Jerdon), which last will, I suspect, bear the prior name of brevirostris, McClelland, P. Z. S. 1839, p. 155. The Nicobar species (true fuciphaga?) is of the same size as C. troglodytes figured by Mr. G. R. Gray, but has a much larger head than is represented in that figure (doubtless incorrectly), and its upper-parts are dusky-black, slightly glossed with green and purple, the lower brownish with white abdomen. The name fuciphaga is, of course, an absurdity: and on perusal of my remarks on the composition of the edible nests (p. 210, ante), our contributor Mr. Laidley remarked to me, that he had arrived at the same result from chemical analysis, which shewed the constituent elements to be those of inspissated saliva.—The Society has just received the Nicobar species from Java.

\* Ac. caudacuta of Australia, and Ac. nudipes of the Himalaya, are enumerated

as separate species by Mr. G. R. Gray.



Sericornis (?) chrysæa, (Hodgson.) Length about five inches and a quarter, of wing two and three-quarters, and tail two and a quarter, its outermost feathers a quarter of an inch less: bill to gape three-quarters of an inch, and tarse an inch and one-eighth. Male having the entire under-parts, shoulder of wing, more or less of the scapularies, the rump, and basal three-fourths of all but the middle pair of tailfeathers, brilliant yellow; the last being also yellow at base, and there is a narrow supercilium of the same: rest of the tail, and the lores and ear-coverts, black: alars, and their larger coverts, blackish, narrowly edged with dull yellowish; and the head and back are dusky olive, with dull yellowish-green margins to the feathers: bill dark above, below pale; and the legs pale. In younger specimens, there is less yellow on the scapularies and wings: and the females have the whole upper-parts uniform dark greenish-olive, with merely a more yellowish shade over the rump; the under-parts sullied yellow; and tail dusky-olive, marked as in the male, but with considerably duller yellow. The young of the year differ from the female in being spotted above like a young Robin.

Mr. Hodgson informs us that this bird "inhabits the central hills of the Himalaya; is shy, solitary, and bush-loving, constantly descend-

<sup>\*</sup> In the sequel (p. 600), I have added a new genus to this group, -Malacocincia,

<sup>+</sup> Other species of Sericornis, however, figured by Mr. Gould, render this generic identification more doubtful.

ing to the ground from its perch: it feeds and breeds on the ground, making a compact saucer-like nest of moss. Eggs verditer." In form it comes very close upon Calliope, and approaches still nearer to Cyanecula, from which its principal structural distinction consists in the more rounded form of its wings and tail, and the somewhat reduced degree of firmness of its plumage; besides which the yellow colouring is a character of the present group. The wings have the fourth, fifth, and sixth primaries subequal and longest, and the first about half their length.

Referring again to the first part of this paper (p. 182, ante), it may be remarked that Mr. Jerdon now considers the Scops sunia and Sc. pennata there described, to be different phases of plumage of the same species. Until I obtain further data, I shall refrain from adding to what I have already stated on the subject; but may remind the naturalist reader, that I have described three distinct states of plumage of the Sc. sunia,—viz. the first or nestling garb, an intermediate dress in both sexes, and the mature livery which is almost uniform deep chesnut-ferruginous: so that the variation to grey would certainly not appear to be dependent either on age or sex.\*

Of Syrnium nivicolum (p. 185), a second specimen has been obligingly presented to the Society (with numerous other valuable bird skins), by Mr. L. C. Stewart, of H. M. 39th Foot, believed to be from the Western Himalaya, where many of that gentleman's specimens were procured. It completely establishes the species, as distinct from S. aluco; and it differs from the specimen already described in the general darker tone of colouring of its upper parts, occasioned by the greater predominance of the fuscous ground-tint, while the scapulary spots are whiter, and there is also an intermixture of white on the facial disk, and the lower parts are less tinged with fulvescent. It is probably a male, and the other a female.

With respect to the species of Brachypternus (p. 194), I find that a third occurs in the Scindian representative of the common Picus (Br.) aurantius. With the dimensions of the latter, it differs from it in the reduced quantity and intensity of the yellow on the upper parts,

<sup>\*</sup> Mr. G. R. Gray identifies Sc. pennata with the European species, and adopts Ephialtes, K. and B., as the generic name.

<sup>+</sup> Lord A. Hay thinks, judging from recollection, that P. micropus is the common species of S. India, P. bengalensis apud Jerdon.

which is also quite free from any orange tinge, and the whitish markings on the wings are much more developed;—distinctions which hold true in both sexes. As I have elsewhere described the species, the present indication of it will here suffice.

I am also informed that the P. badius apud Jerdon, of S. India, differs alike from the true P. (Micropternus) badius of the Malay countries, and from P. (M.) phæoceps, nobis, of Bengal, Nepal, Assam, and Arracan. Accordingly, we now distinguish three species respectively of the subgenera Micropternus, Brachypternus, and Tiga; which certainly confirms the propriety of these groups being thus separated.

Centropus (p. 202). Lord Arthur Hay has obtained a very splendid bird of this genus from Malacca, which is evidently the Cuculus bubutus of Raffles's list, stated to be "not much less than two feet in length;" but it is not Dr. Horsfield's Javanese bird, described to be eighteen inches and a half long (Lin. Trans. XIII, 180), which is precisely the length of the Indian species (vide J. A. S. XI, 1099). This fine species may be appropriately termed

C. eurycercus, A. Hay: being particularly remarkable for the great breadth of its tail-feathers, each of which measures two inches and three-quarters across. Length about twenty-three inches, of which the middle tail-feathers measure half, the outermost being four inches and three-quarters shorter; wing eight and three-quarters; bill to gape nearly two inches (in a straight line), and three-quarters of an inch in vertical height, being much larger than in C. philippensis; tarse two and a quarter; the long hind-claw but an inch. Colour as C. philippensis, but the back and wings are of a brighter and more chesnut brown, and the tail is glossed with steel-blue instead of green. C. philippensis and C. Lathami are also met with at Malasca, and both appear to be much commoner there than the present species. I have also lately received certain information of a Centropus, of the alleged size of C. bengalensis, (and doubtless that species,) occurring in the Calcutta Botanic Garden. My informant brought me C. Lathami from the locality, and stated that he had often there observed the minute species, but was unaware

<sup>\*</sup> Mr. Jerdon writes me word—"The Picus moluccensis figured in the Planches coloriées is certainly distinct from that of Hardwicke and Gray: the former being of course true moluccensis, and I suspect the same as your canicapillus."—A Javanese specimen just arrived is very doubtfully distinct from that of S. India: and I may add, that in Dr. Cantor's Malayan collection is a superb fourth species of Tiga.

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of its being at all a desideratum. It is therefore probable that I shall soon obtain specimens. (C. bicolor, Lesson, has just been received by the Society, with the specific name celebensis, probably of Temminck. It is a very distinct species.)

We may next pass to the paper on Leiotrichanæ, &c., and Fringillidæ, Vol. XIII, pp. 933 et seq., to notice some further identifications which have occurred to me.

Leiothrix furcatus, v. sinensis, must be designated L. luteus. (Sco-poli).

Siva occipitalis, nobis, (p. 937,) makes so considerable an approach in plumage and general character to the Yuhina? flavicollis, Hodgson, As. Res. XIX, 167, that their near affinity is indisputable; and this brings the latter species, for which Mr. Hodgson now proposes the generic name Ixulus (vide sequel, p. 562), within the confines of the group of Leiotrichana, where the slender form of the bill approximates it to Minla, from which it is barely separable, and it thence carries on the series of affinities to Yuhina and also to Myzornis (J. A. S. XII, 984). The Siva occipitalis, however, differs greatly in the form of its bill from Ixulus flavicollis, that of the former being fully as stout as in Proparus, in which group it might very well be classed: and as regards other distinctions, the crown is tinged with rufous, the slightly reverted crest is less developed, the narrow blackish streak from the corners of the mouth does not occur, the under-parts are much more sullied or less whitish, and the wings are longer; yet, notwithstanding these various differences, the resemblance is at first sight not inconsiderable. It may be added, that the name Certhiparus, which Mr. Hodgson wishes to substitute for Minla, is objectionable on other grounds than as concerns the mere alteration; it having been previously applied (apparently by the Baron de la Fresnaye) to a group of New Zealand Meliphagida.\*

<sup>\*</sup> Vide G. R. Gray, in Dieffenbach's 'New Zealand,' II, 189 (1843). This naturalist, by the way, reunites the whole of Mr. Hodgson's divisions of Leiotrichanæ under Leiothrix; and he gives four species of Pteruthius, adding as a fifth the Piprisoma agilis, which has no sort of relationship to the group. The male of Pt. rufiventer, nobis, is beautifully figured, but the sexes of this species are so different, that the female should certainly have accompanied it. As for his mixing up the Leiotrichane birds with Pardalotus, Pachycephala, &c., I am quite of Mr. Strickland's opinion, that the group Pachycephalinæ so formed is an extremely forced and unnatural one; and that such is usually the case, when too little attention is paid to the geography of genera thus brought together.



The Parus (?) minutus, Jerdon, (p. 944,) is probably identical with Erpornis zantholeuca, Hodgson, XIII, 380.

P. nuchalis, Jerdon, is a new species from Southern India. Length about five inches, of wing two inches and three-eighths, and tail two inches; bill to gape nearly half an inch, and tarse five-eighths. Colour black above, as also a broad mesial stripe from throat to vent; cheeks, sides of neck, and of the breast and belly, with the under tail-coverts, white; a white spot also at the nape, as in P. ater, &c., a band of the same across the wing, and the tertiaries very broadly margined externally and tipped with white; outermost tail-feather white, except its inner border, the next with the outer web and contiguous portion of the inner web white, and the third with the outer web white at tip and for most of its basal half; bill black; and legs plumbeous. Inhabits the Eastern ghauts.

Of Ploceus philippinus, (p. 944,) Mr. Strickland writes me word, that the Indian bird, and not Dr. Horsfield's Javanese species, is the true Loxia philippina of Linnæus. It extends its range to Malacca.

Passer montanus (p. 947,) proves to be the more common species of Sparrow in Arracan generally, about 60 of this species occurring to one of P. domesticus, var. indicus: Lord Arthur Hay has also received it from Malacca; and hence a doubt arises whether it be not the Siamese Sparrow mentioned by Crawfurd. P. montanus is also the common Sparrow of Afghanistan.

The division Gymnoris, Hodgson (p. 948), I shall now adopt, on the authority of a second species sent on loan by Lord Arthur Hay, and believed to be from S. Africa.

G. superciliaris (?), A. Hay. Length about six inches and three-quarters, of wing three and three-quarters, and tail two and a half; bill to gape eleven-sixteenths of an inch, and tarse three-quarters. Plumage as in G. flavicollis, with the same yellow spot in front of the neck; but there is no maroon colour on the shoulder of the wing, the anterior whitish bar crossing the wing is narrower, there is a conspicuous whitish supercilium, and the dorsal feathers have the terminal third of their inner web dull dusky-brown, imparting somewhat of the streaky appearance common to most Sparrows: the crown and upper portion

<sup>\*</sup> I hear that a Sparrow of some species, most probably this one, abounds in Singapore.—The Society has just received Ploceus philippinus apud Horsfield from Java.

of the ear-coverts are dark brown, contrasting strongly with the whitish supercilium: bill formed exactly as in the other species.

To Amadina maja, (p. 949,) should have been added, as a synonyme, Loxia leucocephala, Raffles. A. acuticauda, Hodgson, is the Loxia molucca, Lin., and will therefore range as Amadina molucca. Specimens from Malacca are perfectly identical in species with those procured in Nepal by Mr. Hodgson.\*

For Erythrospiza (p. 952), must be substituted the prior name Carpodacus of Kaup: and for Corythus, Strobilophaga of Vieillot.

Carduelis caniceps (p. 955). The Afghan specimen described, was in summer aspect of plumage, when the winter edgings to its feathers had been cast. Its length should have been printed five inches and three-quarters. One from the western Himalaya, in winter garb, is rather smaller, agreeing in length of wing with Gould's figure, and the plumage has a browner tinge, less relieved with white on the fore-neck and breast than in the Afghan summer specimen, or than in C. communis; but the colour is much less dark than in Gould's figure, the red surrounding the base of the beak is also much less developed, and there is no black streak passing backward from the eye.

An oriental species of Ligurinus, or Greenfinch, exists in the Loxia sinensis, Lath., founded on the Verdier de la Chine of Sonnerat. It agrees in size, and in the Goldfinch-like marking of the wings, with L. xanthogrammicus of the Andes.

To the species of Bunting enumerated in pp. 957-8, may now be added

E. melanops, nobis. Length six inches, of wing two and seveneighths, and tail two and five-eighths; bill to forehead seven-sixteenths, and tarse three-quarters of an inch. Head, neck, throat and breast, dull green, paler below, and a little streaked with dusky on the crown; lores, chin, and around the eyes, black; belly and lower tail-coverts sulphur-yellow, the flanks greenish with dusky streaks: scapularies and inter-scapularies rufescent, with a black central streak to each feather;

<sup>\*</sup> Lord A. Hay writes me word—" I have specimens of Amadina punctularia v. nisoria from Malacca, and they seem distinct from our Indian bird; being much lighter-coloured, and the markings seem differently formed."—Should they prove distinct, the Indian species would perhaps rank as Am. lineoventer, (Hodgson:) but I remember comparing Malayan with Bengal specimens some time ago, and observing no difference between them.

the wings blackish, each feather margined with rufescent, palest at the tips of the greater and second range of coverts: rump plain rufescent-greenish: tail dusky, with the terminal two-thirds of its outermost feather white, except the final third of the narrow outer web; and about a third of the inner web of the penultimate feather is also white, obliquely separated: bill dusky, the lower mandible whitish except at tip; and feet pale. From Tipperah, whence a fine specimen has been presented to the Society by M. Courjon. This can hardly be the male of E. sordida, J. A. S. XIII, 958.

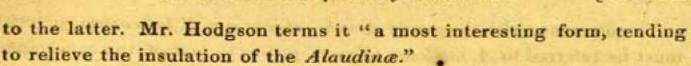
It may be that I was wrong in referring a Peshawur female in the collection formed by the late Sir Alexander Burnes and Dr. Lord, to the *E. icterica* of Central India, in XIII, 957; for both sexes of the Peshawur bird are figured in a drawing made under Sir A. Burnes's superintendence; and though the specimen has certainly every appearance of being the female *E. icterica*, the male is not represented to have any distinct rusty tinge on the head, which is nearly concolorous with the back, except that the *pale* yellow hue of the under-parts is made to surround the ear-coverts, and thence to ascend on the crown, posterior to the eye, so as to divide the brown of the crown from that of the occiput. Should it prove to be a distinct species, and not merely *icterica* represented indifferently, it might bear the name *E. personata*.\*

The following is a remarkable genus, the affinities of which have puzzled me a good deal, but (now that the Society's specimens have been mounted, and I can judge better of their characters,) I incline to think, with Mr. Hodgson, that it is really related to the Larks, though tending to assume the character of some of the Crateropodinæ, as Pellornium and its allies, yet without being truly affined

Since writing the above, Mr. Stewart has favored us with many specimens of E. icterica from the vicinity of Agra, where the species appears to be very common; and the females seem to me to be decidedly identical in species with Burnes's Peshawur female, though the back is less refescent. Burnes's specimen is, however, in old and worn plumage, whilst the Agra specimens have their feathers newly put forth.

I may likewise notice here, that Lord Arthur Hay has obtained E. Lathami, male and female, from Hong Kong; the species certainly identical with the Indian one.

These, and all the other Indian Buntings which I know of, pertain to the division Euspiza of the Prince of Canino, at least according to the classification of Mr. G. R. Gray, which I am not altogether satisfied with. The type of Euspiza is Emb. melanocephala of Scopoli; which is distinct enough in the form of its beak.



Heterura, Hodgson. "Bill moderate, strong, compressed, straight, but with the culmen and compressure curved, and gonys ascending; its base clad with rigid plumes as far as the advanced nares, and the tip for the most part decidedly inclined and notched; tomiæ scarpt and trenchant: gape wide and hispid. Wing short, hardly passing the base of the tail, but Alaudine in all its details; the first and fifth quills equal, and somewhat shorter than the second, third, and fourth, which are longest; centrals notched; the tertiaries equal to the primaries. Tail rigid, somewhat gradated from sides as well as centre, and the separate plumes possessing the divaricate structure, with acutely wedged or hastate points. Legs and feet strong, ambulant: tarse plus the middle toe and nail, strongly scutellate to the front, smooth and cultrated to the back. Toes medial, compresed: the laterals equal; the central sufficiently long; the exterior basally connected to the mid one; the hind least: nails simple, fully curved.

"Hab. Hills only. Not very gregarious: frequent trees, and breed and feed on the ground."

H. sylvana, Hodgson. "General aspect and colours Alaudine, but the body below completely striped. Above brown-black, largely margined with ruddy-luteous [on the sides of the feathers]: below rufescent-luteous, immaculate on throat, but beyond it streaked centrally with more or less wide blackish lines; a dark moustache, and pale brow: lateral caudals more or less albescent: legs fleshy-green; bill horn-colour, with dusky ridge. Length seven inches and a quarter to seven and a half: bill eleven to twelve-sixteenths of an inch; tail two and three-quarters to two and seven-eighths; closed wing two and seven-eighths to three and one-sixteenth; tarse under an inch; central toe to nail thirteen-sixteenths, hind ditto eleven-sixteenths; weight an ounce." Inhabits Nepal.\*

I will next briefly review the Nectariniidæ, which were last taken in hand in Vol. XII, pp. 969 to 984, inclusive.

The Coryphidea baghaira (p. 961, ante.) is identified by Mr. G. R. Gray with Alauda brachydactyla, Auct.; and as this constitutes the type of Calandrella, Kaup, the species will accordingly range as Cal. brachydactyla. The form is quite distinct from Alauda, to which Mr. G. R. Gray refers it; as any one familiar with the living bird must at once acknowledge. Mr. Gray's Indian Alauda are in sad confusion.



To commence with the genus Arachnothera: my A. latirostris (p. 982) must be referred to A. modesta, (Eyton, p. 981); and of the other species briefly described by that gentleman, who erroneously referred them both to Anthreptes of Swainson, the Society has now received two fine specimens from Malacca, which may be thus described:

A. flavigaster, (Eyton). Length about eight inches, of wing four, and tail two inches; bill to forehead one and three-quarters; and tarse seven-eighths. Colour plain olive-green above, paler below, and yellowish on the belly and under tail-coverts: feathers around the eyes, and a tuft near the angle of the jaw, brighter yellow: bill dusky, paler beneath, and the legs have probably been bright yellow. A young specimen is smaller, with the wing three inches and five-eighths long, and the rest in proportion: the plumage is less compact, but the colouring of the upper parts is brighter olive-green, and of the abdominal region much brighter siskin-yellow: in other respects it is similar.\*

Nectarinia mahrattensis, (p. 978,) will bear, as its earliest specific name, that of asiatica, (Lath.) It is also the Certhia mahrattensis, Lath., and C. saccharina of Shaw.† The range of this species extends eastward into Arracan, where also the N. Gouldiæ is met with; but not zeylonica, which is replaced by Hasseltii, as asiatica there begins to be by flammaxillaris, which last, in its turn, is replaced towards the Straits by pectoralis.

N. jugularis, Vieillot, apud nos, (p. 979,) is a new species, and may now rank as N. flammaxillaris, nobis: the length of its tail, misprinted "under half an inch," should have been given as under an inch and a half. The allied N. pectoralis, Horsf., is common at Malacca, and in the Nicobar islands: a specimen in spirit from the latter group measuring four inches long, by six in spread of wing.

Nect. (v. Anthreptes) phænicotis, (p. 979,) ascends so high as Tipperah; and also certain other Malayan birds (as Calornis cantor; and Brachypodius melanocephalus) occur there, which do not appear to have been met with further to the west.

Nect. Phayrei, nobis, p. 1008, proves (as I formerly suspected) to

<sup>\*</sup> The Society has now two, if not three, additional species of this genus from Java, which require more study than I can at present bestow on them.

<sup>†</sup> N. strigula, (Hodg.) is the young.

‡ Lord Arthur Hay has pointed out to me some distinctions between the Tipperah and Arracan Calornis, and the closely allied species of the Straits.



be N. Hasseltii, Tem., and is common also at Malacca. It is the Certhia sperata, var., of Raffles's list.

Nect. (v. Anthreptes) frontalis, nobis. Differs from the female of N. lepida (v. javanica, Horsf.,) in having the bill rather shorter; the upper parts of a richer, somewhat darker, and more aureous, olive-green; and the lower parts greenish-grey, without any yellow: the throat, and cheeks especially, inclining to be cinereous: the frontal feathers alone are scale-like, and of a brilliant steel-green. Length about five inches, of wing two and three-eighths, and tail two and one-eighth; bill to gape three-quarters of an inch; and tarse nine-sixteenths. From Singapore.

Dicœum chrysochlorum, nobis, p. 1009, extends its range southward to Malacca.

- D. erythronotum, p. 983, bears the prior name of cruentatum, (L.)\*
- D. Tickelliæ, nobis, is the Certhia erythrorhyncha, Lath., a name, however, which is too inaccurate to be retained. Young birds, when they leave the nest, have the beak of a flesh-red colour, except just the tip; and a specimen in this state is figured among Buchanan's drawings, with the reddish colour of the bill exaggerated; and it was probably upon a copy of this very drawing that Latham founded the species. Being the Nectarinia minima of Tickell (not of Sykes), it might therefore be termed Dicæum minimum, (Tickell). The range of the species extends into Tipperah and Arracan.
- D. ignicapillum of Eyton is the Prionochilus percussus, (Tem.) Strickland: and in form and colouring it bears much the same relationship to Piprisoma agilis, (Tickell) nobis, XIII, 395, that the bright-coloured Malayan Dicæa do to the dull-coloured species which alone inhabit the peninsula of India. To this genus Prionochilus, Str., P. Z. S. 1841, p. 29, are referred the various Malayan species which M. Temminck has strangely classed in Pardalotus, as his P. thoracicus and P. maculatus, in addition to the percussus: and the so-called Pardalotus pipra of Lesson's Traité (stated to be Himalayan), upon which the latter naturalist has since founded his Idopleura, turns out to be

<sup>•</sup> Dr. Horsfield informs me, in epistola, that the Javanese species which he referred to cruentatum is distinct from the Bengal one, or true cruentatum. It is probably, therefore, one the Society has just received from Java, which has the head, neck, throat, breast, whole inter-scapularies, rump, and upper tail-coverts, scarlet, wings and tail blue-black, and lower parts pale ashy, except the under tail-coverts which are white. D. cruentatum is common at Malacea.



South American; which satisfactorily disposes of all the Asiatic species that had been assigned by authors to the very peculiar Australian genus *Pardalotus*, warranting and confirming our suspicions in other instances, wherein the French naturalists more particularly have strangely inclined to disregard some of the most striking exemplifications of the geographical limitation of particular forms.

Two well marked species of *Prionochilus* are now before me, which may be described as follow:

- 1. Pr. percussus, (Tem.): Dicœum ignicapillum, Eyton. Length about three inches and seven-eighths, of wing two inches to two and a quarter, and tail an inch and a quarter; bill to gape seven-sixteenths, and tarse half an inch. Colour dull lavender-blue above, the lower parts bright yellow, passing to whitish on the lower tail-coverts; a large igneous-red spot on the vertex, and another in the centre of the breast; and a white streak from the side of the lower mandible, divided from the yellow of the throat by another of the same colour as the upper parts. Bill black above, more or less whitish beneath; and legs lead-coloured. Mr. Eyton describes the female to be ashy above, with the under-parts yellow irregularly streaked with cinereous; and a red spot on the vertex. The young are olive-green above, paler below; and it is doubtful, from a specimen before me (which has advanced in its moult), whether there is either coronal spot, or more than a trace of one, or of yellow on the under-parts, in its first plumage. Malacca.
- 2. Pr. thoracicus, (? Tem.) The appropriateness of the name leaves little doubt of this species being properly identified; and it is not unlikely that Pardalotus maculatus, Tem., refers to the female or the young. Length four inches and a quarter, of wing two and three-eighths, and tail an inch and a quarter; bill to gape half an inch, and tarse rather more. Head, neck, breast, and throat, black, with an igneous-red spot on the vertex, and a very large patch of the same on the middle of the breast; wings and tail also black, some of the feathers slightly margined with olive; back greenish-yellow, brightening on the rump, and becoming vivid yellow on the upper tail-coverts, and on the shoulder of the wing; axillaries, and fore-part of the under surface of the wing, white; and the remainder of the lower parts yellow, tinged with olive on the flanks. A presumed female has the entire upper parts olive-green, with an igneous coronal spot, less red than in the

male; a whitish streak from the base of the lower mandible, separated by an olive-green streak from the slightly yellowish white hue of the middle of the throat; and the under-parts yellow, brightest along the centre, and streaked laterally with olive-green; lores whitish, and the axillaries and under surface of the wing white, as in the male. A presumed young male is olive-green above, the crown ashy, with a central spot of olive-green; middle of throat white, its sides ashy, with no decided white streak from the base of the lower mandible: the lower parts are yellow, mixed with olive-green, and having an indication of the red pectoral spot of the adult male. Also from Malacca. The mature male here described is in the collection of Lord Arthur Hay.

The curious species described as Pachyglossa melanozantha, H., in J. A. S. XII, 1010, is thus characterized by Mr. Hodgson:

Pachyglossa, H. "General structure of Myzanthe" (J. A. S. XII, 983), but much less delicate. Bill conspicuously short, thick, conic and blunt, with the gonys ascending strongly; yet typically denticulate on the tomial margins. Tongue as long as the bill, thick, fleshy, with cartilaginous bifid tip. Wings with the first quill very minute and spurious: the three next subequal and longest. Legs and feet as in Zosterops, strong: tarse to sole just plus the middle toe and nail. Toes short, depressed, unequal; the fores much basally connected; the hind smallest, with or without the nails: nails very falcate, stout, equal.

"P. melanozantha, mihi. Length five inches; bill seven-sixteenths; tail one and three-quarters; wing under three inches; tarse nine-sixteenths; central toe and nail the same; hind three-eighths of an inch. Blue-black, paler below, and a broad white stripe passing from chin to breast, whence to the vent inclusive is rich yellow. Alars and caudals dusky. The extreme caudals with a large white spot near the tips inside. Bill dusky-blue, with fleshy base. Legs plumbeous. Female duller-bued, and more or less shaded with olive.

"These birds are peculiar to the hills. They are shy, and make ingenious pendulous nests, like the Myzanthe. Their food consists of small insects and viscid berries, which latter they swallow entire. The upper mandible is (typically) denticulated."

As many as six generic forms certainly require to be distinguished in this Dicœum group, which are as follow:—1, Myzomela, exemplified by M. sanguinolenta and other Australian species; 2, Dicœum, as D.

<sup>&</sup>quot; Unfortunately, this name too closely resembles Myzantha, of the Meliphagidae.

cruentatum, D. concolor, D. chrysochlorum, &c.; 3, Myzanthe, Hodg., ante, as M. hirundinacea of Australia, and M. ignipectus of the Himalaya; 4, Pachyglossa, Hodg., ante, P. melanozantha; 5, Piprisoma (XIII, 314), P. agilis; and 6, Prionochilus, ante. The three first differ chiefly in the degree of elongation of the bill, and the two last are also allied together; and they combine to form a natural and satisfactory group.

Of the remarkable form noticed as Myzornis pyrrhoura in XII, 984, I find also the following description by Mr. Hodgson:

Myzornis, H. "General structure of Yuhina (As. Res. XIX, 165), but slighter. Bill moderately slender, more or less cylindric, and arcuate with both tips down; the upper conspicuously longer, and furnished with one sharp tooth: nares lineo-lunate, typically large and soft: wings, tail, and feet as in Yuhina; but the feet stronger, and the wings and tail more feeble. Tongue brushed. Hab. Northern and central hills [of Nepal.]

"M. pyrrhoura, mihi. Bright parrot-green, more or less merged in rusty on the throat and vent. Outer margins of caudals, and of mid-alars, fiery-red, or carmine: wings tipt with white. Lores black, and black streaks on the crown. Legs fleshy: bill black. Length five inches and a half; bill eleven-sixteenths; tail one and five-eighths; wing two and seven-sixteenths; tarse fifteen-sixteenths; central toe and nail five-eighths; bind nine-sixteenths. Remark.—These birds have the manners and general structure of Yuhina: but they want the Bulboul-like crest common to all the species of that type: their more slender bill is unidentate only, and their tarse is longer, being a third plus the middle toe and nail; it is also stout, and quite smooth. We may here add, that our Sibia is another truly meliphagous form, proper to these hills."

Yuhina, Hodgson, since termed by him Polyodon, is re-defined as follows, and a third species described; the flavicollis, passim, being removed, and regarded as a distinct type, Ixulus.

"Bill moderate, much depressed as far as the large nares, compressed beyond. Tip of the upper mandible inclined, with three [minute] teeth on each side: gape bristled, reaching to the eyes: brows soft. Nares large, fossed, membranous; the aperture lunated

<sup>\*</sup> This elongation of the bill is, I suspect, merely further carried out in Drepanis, Tem., v. Melithreptus (in part), Vieillot.

by the nude soft membrane. Tongue as long as the bill, moderately extensile, cleft nearly to the base, and the prongs convolved and filamentous, forming a full brush: wings medial, the fifth quill longest. Tail nearly even and divaricate. Alars and caudals wedged and mucronate. Legs and feet strong and repert. Types, gularis, occipitalis, and nigrimenta: the two former published; the last new.

"Y. nigrimenta, H. Above olive-brown; below rufescent-yellow; cheeks and throat white; tip of chin, and lores, black: crest slaty-blue, legs fleshy. Bill dusky above, ruddy-fleshy below. Length four inches and a half; bill five-eighths of an inch; wing two inches and one-eighth; tail one and five-eighths; tarse three-quarters of an inch; central toe and nail half an inch; hind seven-sixteenths. [Non vidi.]

"These birds are genuine Meliphagidae, with the brushed tongue of the type of that group. They feed on tiny insects that harbour in the cups of large deep flowers, such as the Rhododendrons, and to which the birds cling with their strong feet. They also take berries occasionally. They are exclusively monticolous, like our Saroglossa (J. A. S. XIII, 367), another Meliphague in the guise of a Stare, and therefore probably related to the Etourneau verdâtre.

"Ixulus, H. Bill short, as in Brachypus [Pycnonotus?], but less stout, and the nares larger and more membranous. Tongue simple. Head crested. Wings rather short, more or less acuminated, the first three quills gradated, and the three next subequal, the fifth being usually longest. Tail moderate, subfurcate. Legs and feet suited for clinging. Tarse elevate, stout, considerably plus the mid-toe and nail.

—Anteal toes short, unequal, depressed, and considerably connected at their bases. Hind large, broad, equal to inner fore without the nails, and to the outer with them. Nails Parian.

"Type I. flavicollis," olim Yuhina flavicollis, As. Res. XIX, 167. The near general approximation of my Siva occipitalis to this species has already been noted (p. 552), although the beaks of the two birds are very different.

The Indian Zosterops, (XII, 985,) it now appears, has been designated maderaspatanus by mistake. "There is properly," writes Mr. Strickland, "no such specific name as maderaspatanus for a

<sup>\*</sup> I differ from Mr. Hodgson respecting the affinities of the Saroglossa, which I consider to be decidedly a Sturnidous bird, with meliphagous adaptations.—Cur. As. Soc.



Zosterops. Linnæus only wrote it in his Syst. Nat. by a slip of the pen for madagascariensis, as the bird he called Motacilla maderaspatana was from Madagascar, and Gmelin properly corrected the name to madagascariensis." The Indian species is the Sylvia annulosa, Var. A, of Swainson's Illustrations, and will now rank as Z. annulosus, (Sw.) It seems peculiar to the hilly parts of the country, from the Himalaya to Ceylon.

A second described oriental Zosterops, inhabiting Java and the Philippines, and probably the Malay countries generally, is the Dicaum flavum of Horsfield, Lin. Tr. XIII, 170. Dr. Horsfield informs me, that "it is nearly allied to the Indian species, but distinct."

Z. nicobaricus, nobis, is a third common in the Nicobar islands. Length four inches, by six in extent of wings; closed wing two inches; tail one and a half; tarse five-eighths of an inch; bill to gape ninesixteenths. Nostrils covered as usual by a soft impending scale; and the tongue subdivided at tip into a pencil of thin filaments. Upper parts greyish olive-green, greenest on the forehead, wings, and upper tail-coverts: throat and front of neck pale yellowish, the breast and under-parts whitish, except the lower tail-coverts which are light yellow: eyes surrounded, as usual, by silky white feathers; the lores and beneath the white orbital feathers blackish, the former surmounted by a yellowish line. Bill dusky, the base of the lower mandible pale; and the legs albescent-plumbeous. Upon dissection, the muscular coat of the stomach of a bird of this species was found to be considerably more developed than in Nectarinia, and both stomach and intestines contained numerous hard black seeds, about the size of No. 8 snot: these had probably been contained in a pulpy berry; and the fact of their passing the intestines is worthy of notice, as a Thrush fed upon haws invariably ejects the stones by the mouth.

There are two or more species of this genus in the Isle of France: viz. Z. curvirostris, nobis. A good deal allied to the last in plumage, but having a more slender and distinctly incurved bill, rather longer than usual in the species of Zosterops; the tongue subdivided at tip into numerous filaments, forming a tolerably large brush. Length about four inches, of wing two inches, and tail one and a quarter; bill to gape five-eighths, and tarse three-quarters of an inch. Orbital feathers conspicuously white as usual. Head and fore-part of the neck dull ashy, tinged slightly with green; the rump, wings, and tail,

brightish olive-green: under-parts ashy, more or less pure, and passing to rufescent-whitish on the belly; the lower tail-coverts bright yellow; and the throat whitish, slightly tinged with yellow in one of two specimens: bill dusky, the basal two-thirds of the lower mandible yellowish; and the legs pale.

The true Z. madagascariensis also inhabits the Mauritius: but this, as Mr. Strickland informs me, is a short-beaked species, and therefore cannot be the same as the foregoing; besides that the description of it does not sufficiently apply to Z. curvirostris.

Z. (?) borbonicus, (Brisson). This is nearly allied to Zosterops, but is without the white orbital feathers so characteristic of that genus; it has also much the look of the British Curruca sylviella (upon a superficial view), but has no particular affinity for the latter.\* It is probable that some more immediate congeners of this bird inhabit Australia, where not only the genus Zosterops attains its chief development of species, but also more especially the great austral group Meliphagidæ, to which Zosterops strictly belongs. The present species is also from the Isle of France.

Genus Phyllornis, Boie, v. (subsequently) Chloropsis, Jardine and Selby. The gradual enrichment of the Society's museum enables me now to offer a more satisfactory synopsis of this genus than that attempted in XII, 955 et seq.

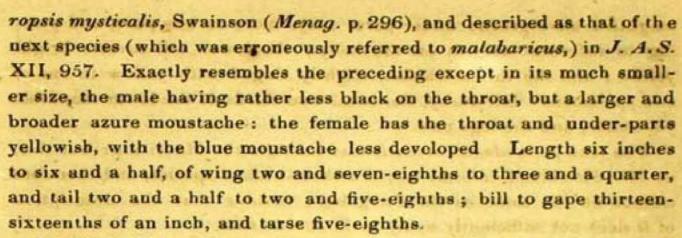
A. With thicker bills, the upper mandible abruptly bent over (more or less so, in different specimens,) and sometimes quite hooked at tip. The shoulder of the wing uniformly green with the rest. Peculiar to the Malay countries.

1. Ph. Sonneratii, (Jardine and Selby): Ph. Mullerii, Tem.; female, Turdus viridis et Chloropsis Losterops of Horsfield: young male, Chl. gampsorhynchus, Jardine and Selby.

2. Ph. cyanopogon, Tem.: female, (or perhaps young male,) Chlo-

By the way. I may here notice that the Curruca sylviella (v. garrula), so called, of S. India, is conspicuously a larger bird than its European relative, having the wing fully two inches and three-quarters long, and the rest in proportion: the general tone of colour is also somewhat darker, and the bill and legs are proportionally larger and stronger, the tarse measuring from thirteen-sixteenths to seven-eighths of an inch. As for the roseate tinge on the under-parts mentioned by Sykes, this is common to fine specimens from either country. I certainly consider the Indian bird to be distinct, and shall therefore name it C. affinis.

Prof. Behn also informs me, that the species assigned to C. orphea by Mr. Jerdon, is not the true C. orphea of continental Europe.



B. The bill tapering to its extremity, and slightly curved. The shoulder of the wing of an ultramarine colour, more or less extended. Hab., for the most part, India, Burmah, and probably China.

3. Ph. cochinchinensis, (Lath., Gm.), the adult male, and malabaricus apud Latham, the young male; Chl. cochinchinensis, Jardine's synopsis: Verdin de la cochinchine, Buffon; Chl. malabaricus apud nos, J. A. S. XII, 957 (nec feem.), and probably of Eyton, P. Z. S. 1839, p. 102; probably also Meliphaga javensis, Horsfield. This is the only species of the present subdivision which I have seen from the Malay countries; and specimens from the vicinity of the Straits present a considerable approximation in the form of bill to the members of the preceding section, while those from Arracan have decidedly a more tapering bill, less abruptly curved at the tip, and approaching therefore to the Indian type of Phyllornis. If I am right in identifying the Chl. malabaricus apud Eyton with the present species (of which I have little doubt), that author states that " the female differs from the male in having the markings less distinct:" this is probably the case with the mature female; but what I suspect is a young female from Singapore has the forehead, throat, and region of the eyes, green, and a fulvous tinge on the crown only, not any below; and a presumed young male from Arracan has a strong fulvous tinge on the crown, neck, and breast, while the throat is greenish, with distinct verditer moustache, more developed than that of the female cyanopogon. In any state of plumage, the latter species may be readily distinguished from this other small one, by the total absence of blue on its wings and tail.

The three foregoing species are all common in the vicinity of the Straits of Malacca, and I doubt if any of the following occur in the Malay countries. The two next are proper to the peninsula of India, No. 4 only extending to the hill regions of Bengal.

- 4. Ph Jerdoni, nobis: Chl. cochinchinensis apud Jerdon, Catal: the male described as the female of the next, in J. A. S. XII, 956.
- 5. Ph. malabaricus, (Gm.); le petit Merle de la côte de Malabar, Sonnerat: Chl. cæsmarhynchos,\* Tickell; Chl. aurifrons apud Jerdon, Catal.

And the two remaining species inhabit Nepal, Assam, Sylhet, and Arracan; No. 6 extending into Bengal.

- 6. Ph. aurifrons, (J. and S.); figured as Chloropsis malabaricus by Messrs. Jardine and Selby, as subsequently corrected by them in their synopsis of the genus.
- 7. Ph. Hardwickii, (J. and S.): Chl. curvirostris, Swainson; Chl. cyanopterus, Hodgson; Chl. chrysogaster, M'Clelland and Horsfield; and Chl. auriventris, Guérin.

I shall now essay to enumerate the Indian and Malayan Bulbouls, which are very numerous, and pertain to various genera.

To commence with the genus Pycnonotus of Kuhl, comprising Hæmatornis of Swainson, nec Vigors.

- 1. P. bengalensis, nobis: P. v. Ixos cafer, apud nos et alios, ante.†
  Bengal, Nepal, Assam, Sylhet, Tipperab.
- 2. P. hæmorrhous, (Lath.): Hæmatornis pusillus et pseudocafer, nobis, J. A. S., X, 841, &c.; cafer apud Jerdon, Catal. Peninsula of India, and Arracan: common about Agra.
  - 3. P. jocosus, (L.): Gracula cristata, Scopoli; Lanius emeria, Shaw.

\* This unmeaning name, cæsmarhynchos (apud Tickell), v. casmarhynchos (apud Gray), is merely a misprint for gampsorhynchus of Jardine and Selby: vide Griffith's 'Animal Kingdom,' VI, 391.

+ In a letter lately received from Lord Arthur Hay, his lordship says-" I have been inspecting Buffon's figure of the true cafer from the Cape, and it does not agree in the least with the Bengal bird." Mr. Strickland, judging from the admeasurements alone (in the An. and Mag. N. H., Vol. XIV, 47), concluded them to be the same. The wide difference of habitat, however, would lead to a pre-supposition of their distinctness; and presuming that they do differ, I now propose for the common Bengal species, the specific name bengalensis. This name is, indeed, better applicable than such terms usually are, since it is very doubtful whether more than two species of the genus exist in Bengal, this and the jocosus, and the present one is by far the more abundant of the two. It is closely allied to P. hæmorrhous, from which it differs in its larger size, and the greater extent of the black colouring. which spreads over the whole neck (excepting the ear-coverts, which are brownish), and low upon the breast, the back and belly also being much darker than in P. hæmorrhous, but the feathers of these parts are similarly margined with greyish. Length nine inches and a half, by twelve and a half in spread of wing ; the closed wing four inches, and tail the same.

India generally, extending eastward to Tipperah and Arracan, and thence southward to Penagg and even Malacca.\*

- 4. P. monticolus, (M'Clelland and Horsfield), Proc. Zool. Soc. 1839, p. 160. Said to differ from the last by having "a scarlet ring about the eye, but no tuft beneath this organ." Kossia mountains, Assam. It rather requires verification.
- 5. P. crocorrhous, Strickland, An. and Mag. N. H. 1844, p. 412: Muscicapa hæmorrhoussa, Var. B., Gm.; Turdus hæmorrhous, apud Horsfield. Java.
- 6. P. bimaculatus, (Horsf.), Lin. Tr. XIII, 147. Java.
- 7. P. goiavier, (Scopoli): Muscicapa psidii, Gm; Turdus analis, Horsfield. Malay countries generally.
- 8. P. leucotis, (Gould), Proc. Zool. Soc. 1836, p. 6. Common in Scinde, and I am informed also in Guzerat. It is likewise enumerated in a list of birds "collected in the north-western provinces of the Bengal presidency, in north latitude 29° to 31°, and east longitude 77° to 88°", and consisting chiefly of inhabitants of the plains, but with a few from the Himalaya, in P. Z. S. 1842, p. 92.†
- 9. P. leucogenys, (Gray), Hardwicke's Ill. Ind. Zool. Common in the Himalaya, and in Kashmir.
- 10. P. flavirictus, Strickland, An. and Mag. N. H. 1844, p. 413: Tricophorus virescens, Tem., apud Jerdon. Southern India.
- 11. P. plumosus, nobis. Length about seven inches, of wing three and a quarter, and tail three inches; bill to gape three-quarters of an inch; and tarse the same. This bird is remarkable for the extraordinary density and copiousness of its rump plumage, which has suggested the name bestowed on it. Colour of the upper parts darkish olive-brown, shaded with dull green, the wings and tail margined with brighter green; coronal feathers rounded and scale-like, of a cinerascent hue, slightly margined laterally with greenish: under-parts pale brown, lightest on the throat, and the lower tail-coverts slightly ochreous. Bill

# I have not actually compared Malayan with Bengal specimens, but have an impression that the crimson ocular tuft is considerably less developed in the former.

4 H

<sup>†</sup> In this list are several names, which, I suspect, require to be corrected: viz. "Hirundo riparia?" probably H. sinensis; "Oriolus galbula," probably O. kundoo; "Malacocercus striatus," probably M. terricolor; "Ianthocincla leucocephala," doubtless Garrulax leucolophos; "Megalurus palustris, Sykes," probably Pellornium ruficeps, which is Megalurus ruficeps, Sykes; and "Centropus sirkee," probably Taccocua infuscata, nobis.

dusky, and feet appear to have been reddish-brown. Two specimens are perhaps distinct, though very closely allied. In these the greenish tinge is wanting, even on the wings and tail, and there is no ashy tinge on the head, the feathers of which are much less scale-like; the lower tail-coverts also have a less decided tinge of ochreous, and the throat is much less albescent. In other respects they are similar. These are from Malacca, and the former from Singapore. Should they prove distinct, the second may bear the specific name of brunneus. One or both are probably alluded to as one of two varieties of P. goiavier, (v. Turdus analis, Horsf.,) mentioned by Sir Stamford Raffles.

- 12. P. flavescens, nobis. So like the next in its general characters and colouring, that it might be supposed to be the female of that species, differing from the male in wanting the yellow spots on the throat, and the yellowish colour on the crown, were it not that the tail is always considerably more graduated, its outermost feathers measuring three-quarters of an inch shorter than the middle ones; whereas in P. Finlaysoni the difference is but half as much: it would, besides, be contrary to the analogy of all its congeners, for the sexes to present so marked a difference. Length about seven inches and threequarters, of wing three and a quarter, and tail four inches; bill to gape seven-eighths of an inch, and tarse three-quarters of an inch. Colour dull greenish-olive above, the crown darker, with broader and more rounded coronal feathers than in P. Finlaysoni; alars margined with brighter yellowish-green, and caudals less decidedly: under-parts paler, mingled with dull yellow, imparting a streaky appearance; the vent and lower tail-coverts bright yellow, paling on the belly : lores blackish, surmounted with yellowish-white. Bill and feet dark. Hab. Arracan, where much less common than the next species.
- 13. P. Finlaysoni, Strickland, An. and Mag. N. H., 1844, p. 411.
- 14. P. zantholaimus, Jerdon, MS. Length seven inches and a quarter and upwards, of wing three inches to three and a half, and tail three and a quarter to three and a half; bill to gape three-quarters of an inch to thirteen-sixteenths, and tarse three-quarters to seven-eighths. Upper parts ashy, tinged with green on the wings and tail, the crown yellowish-green, and throat and fore-neck pale yellow;

<sup>\*</sup> Since the above was printed, I have received from Lord Arthur Hay a specimen of this brunneus, labelled by his lordship Brachypus modestus, A. Hay.



lower parts of a lighter ash-colour than the back, the tibial feathers and under tail-coverts pale yellow, and all but the middle tail-feathers tipped with yellowish-white, increasing in quantity to the outermost: bill and feet dark. Hab. Southern India.

15. P. melanocephalus, (Gray), Hardwicke's Ill. Ind. Zool.: Brachypus plumifer, Gould, Proc. Zool. Soc., 1837, p. 137; Vanga flaviventris, Tickell, J. A. S. II, 573. Himalaya, Assam, Sylhet, Tipperah, and Arracan; also Central India.

All the above are in the Society's museum, with the exceptions of P. crocorrhous, P. bimaculatus, and the somewhat dubious P. monticolus. Also a common Chinese species, the P. sinensis, (Lath.), founded on le Gobe-mouche verdâtre de la Chine of Sonnerat, and figured as Turdus occipitalis, Tem., by MM. Eydoux and Gervais, in the 'Voyage de la Favorite'. Dr. Cantor procured this bird in Chusan, and the Society's specimens are from Macao. That figured by the French naturalists cited was obtained at Manilla. In general, however, the ear-coverts have a central whitish spot, instead of being wholly blackish, as represented in the coloured figure adverted to. Another common Chinese species, which is in the collection of Lord Arthur Hay, is le Gobe-mouche à tête noire de la Chine of Sonnerat, v. P. atricapillus, (Vieillot).\*

The following Malayan species are, I presume, to be added to those already noticed.

Ixos virescens, Tem. (p. c. 382, fig. 1), which would seem to be allied to P. plumosus.

I. chalcocephalus, Tem. (p. c. 453, fig. I).

Lanius xanthogaster, Ruffles, Lin. Tr. XIII, 309. This, however, is more doubtful as a true Pycnonotus.

Also two species from Southern India (in the Mysore district, bordering the Neilgherries), which Mr. Jerdon procured, but unfortunately

<sup>\*</sup> Since writing the above, P. atricapillus has been received on loan from Lord A. Hay. Its place in the series is between P. jocosus and P. leucotis, but with the crimson lower tail-coverts of the first, though more brilliant. Length nearly nine inches, of wing three and three-quarters, and tail four inches; bill to gape seven-eighths, and tarse the same. Colour of the upper-parts light brown, with greyish edgings to the feathers, the upper tail-coverts and the entire under-parts brownish-albescent; cap glossy black, the feathers not much elongated; chin, lores, and beneath the eyes, also black; wings deep brown, the feathers margined paler; and tail dusky-black, gradually deeper on the terminal half, the caudal feathers being all tipped with white: bill black, and legs dusky-black.

lost the specimens before he took a description of them. Coloured drawings of them, however, were taken by a native painter in Mr. Elliot's service, and from these Mr. Jerdon drew up the following notices. Vide 'Madras Journal', No. XXX, p. 168. They were about six and a half or seven inches in length, the second being rather the smaller.

"Yellow-eared Bulbout. Above yellowish-green, beneath yellow; ocular region black; a plume of soft loose feathers over the ear tipped with yellow.

"White-eared Bulboul. Above light green, beneath greenish-yellow; head, neck, and breast, dusky grey; ear-spot white."

Lastly, as a very aberrant species, I shall provisionally refer to this genus the bird considered by Mr. Jerdon to be the Turdus indicus, Gm., and ranged by him in the same division with Pycnonotus flavirictus; but which Mr. Strickland thinks is considerably too small for Gmelin's indicus, and has therefore given it a new name, describing it as Criniger? ictericus, An. and Mag. Nat. Hist., 1844, p. 411. The only specimen in the Society's collection, and which was presented by Mr. Jerdon, accords in its dimensions with those given by Mr. Strickland; but Mr. Jerdon gives the length as from seven and a half to eight inches, wing four inches, and tail three and a half, which last admeasurement only, holds true in the Society's specimen: and if the species ever attains those dimensions, I think there can be no objection to identifying it as the indicus of Gmelin.\*\*

Alcurus striatus, (Blyth) Hodgson, J. A. S. XI, 184. This differs little from Pycnonotus in form of bill, but its large size and thick heavy body ally it to Criniger (v. Tricophorus), in which genus I originally placed it, while Mr. Hodgson first assigned it to Pycnonotus. It does not, however, range well, with any other species known to me, and at my recommendation Mr. Hodgson applied the name Alcurus to it, which I here adopt.

Genus Criniger (subsequently Tricophorus), Temminck.

1. Cr. ochrocephalus, (Gmelin): Tricophorus crispiceps, nobis, J. A. S. XI, 204. Malay countries generally, and the Tenasserim provinces. It is a favorite cage bird with the Malays.

\* It is remarkable that a common African Bulboul (Pycn. chrysorrhœus) has recently turned up in Ireland. Vide An. and Mag. N. H. 1845, p. 308: the whole group of Bulbouls being, otherwise, extra-European, and there is nothing approaching to the form in all America. Neither do I remember a single Bulboul genus in Australia.

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- 2. Cr. flaveolus, (Gould), Proc. Zool. Soc. 1836, p. 6. Common in the Himalaya, and in the hill ranges of Assam, Sylhet, and Arracan. An allied South African species is figured by Dr. Andrew Smith, as Tricophorus flaviventris.
- 3. Cr. Tickelli, nobis: doubtfully referred to Ixos virescens, Tem., by Capt. Tickell, J. A. S. II, 573, but evidently a distinct species of the present genus, allied to the preceding one. From near Midnapore. (Non vidi.)
- 4. Cr. gularis, (Horsfield), Lin. Trans. XIII, 150. Allied in plumage to Cr. flaveolus, but crestless, and the beak remarkable for its Vanga-like, or Lophocitta-like, form, with the tip of the upper mandible abruptly bent over. Malay countries generally.
- N. B. I may here remark, that the genera Lophocitta, Vanga, and Prionops, form together a peculiar group of Bulbouls, of which the only known oriental species is Lophocitta galericulata, (Cuv.), common near the Straits of Malacca: but the Lanius coronatus, Raffles, Lin. Tr. XIII, 306, would seem to be nearly allied. The habits of Prionops talacoma, as described by Dr. A. Smith, are quite those of the ordinary Bulbouls.

Spizixos, nobis, n. g. General structure of Pycnonotus, but differing greatly in the shortness and (for a member of this group) extraordinary thickness of the bill, the lateral outline of which approaches that of Conostoma amodius, Hodgson, J. A. S., X, 856, except that the tip of the upper mandible curves more decidedly downward over that of the lower mandible, being also pointed and distinctly notched, with a sinuation corresponding to the notch in the lower mandible: as viewed from above, however, the resemblance to the beak of the Conostoma ceases, for that of the present bird narrows evenly to a point from a tolerably wide base: the ridge of the upper mandible is obtusely angulated, and it is distinctly arched, rising at base where concealed by the feathers of the forehead. Rest as in Pycnonotus, but approaching to Criniger.

Sp. canifrons, nobis. Length about eight inches, of wing probably

\* Mr. G. R. Gray, I observe, gives, as synonymes of Lophocitta galericulata, the Lanius scapulatus, Licht., L. coronatus, Raffles, and Vanga cristata, Geoff., figured in Griffith's 'Animal Kingdom'; but the figure adverted to has a much flatter bill, which is coloured white, and the primaries are coloured rufous. Mr. G. R. Gray refers Lophocitta to the Jay group, in which I cannot agree with him.—The Society has now received Lanius coronatus, Raffles, which is obviously the female of Loph. galericulata.



three and three-quarters (but the first primaries were growing in the specimen), and of tail three and a half: bill to forehead a little exceeding half an inch, and to gape three-quarters; tarse also three-quarters of an inch. General colour bright olive-green, becoming yellowish-green and more vivid on the rump and margins of the primaries, and inclining also to yellow on the belly and more decidedly on the lower tail-coverts: forehead and chin pale ashy; the nape, with the sides and front of the neck, somewhat darker, passing into blackish on the throat; and the crown black, its feathers lengthened to form a crest nearly an inch high: tail-feathers largely tipped with blackish. Bill yellow; and legs brown. Hab. Cherra Poonjee, or the hill ranges bordering on Sylhet to the northward.

Hemixos, Hodgson, n. g. "Bill to gape rather longer than the head, [moderately slender,] inclining to arch, with terminal notch, and erect, entire, trenchant tomiæ. Tongue cartilaginous, and simply bifid. Rictus bristled. Nares lunate, lateral, shaded above by a small unarched nude membrane, which is set over by small nareal bristles. Legs and feet very short, but stout: the tarse strong and smooth. Toes short, very unequal, depressed; the fores basally connected, the outer one as far as the joint, the inner less so. Nails strong, acute, and highly curved. Wings medial, round, acuminate; the fifth quill longest: the first two much, and the two next slightly, gradated. Tail ample, very firm, even, but inclining to furcation.

"H. flavala, mibi. Length eight inches and a third; expanse twelve inches; closed wing four inches; tail three and a half; bill to gape an inch; tarse (to sole) thirteen-sixteenths; central toe nine-sixteenths; outer seven-sixteenths; inner three-eighths; hind five-sixteenths. Weight 1 oz." General colour ashy, with dusky wings and tail, the former having the secondaries and tertiaries, with their great range of coverts, broadly margined with bright greenish-yellow, and the tail a little tinged with the same externally: throat and lower tail-coverts white; the belly greyish-white, and the breast of a paler ash-colour than the back: lores and streak from base of lower mandible black; the ear-coverts brown, and crown dusky-greyish, the coronal feathers lengthened and pointed, as in Hypsipetes. Bill black, and legs plumbeous.

"This type," remarks Mr. Hodgson, "is compounded of the characters of Hypsipetes and of those of the Bulbouls, between which it claims a place. Its manners, like its form, are intermediate. It feeds mostly

on pulpy berries, but likewise takes soft and imperfect insects. It does not sing, nor is caged; and it seems to be wholly confined to the hills, being unknown below. The sexes are alike in colouring, but the male is rather the larger bird. The stomach is muscular, and of considerably unequalthickness in its outer coat; the inner being tough and striate. Intestinal canal eight inches and a half, the cœca very small and rudimentary. Contents of stomach commonly berries, rarely soft and imperfect insects, and also some perfect and hard ones chiefly in winter." (Hodgson's MSS.) It appears to be very common along the sub-Himalayan ranges, extending to those of Assam, Sylhet, and Arracan.

Iole, nobis, J. A. S. XIII, 386. This distinct form, I am now satisfied, falls under the Bulboul group, being allied to the preceding, and to Hypsipetes. The coronal feathers are pointed, as in both; and the beak is that of Hypsipetes, shortened and widened, and thus deviating in the Flycatcher direction; the whole form being also shortened, or as in an ordinary Bulboul.\*

I. olivacea, nobis, J. A. S. XIII, 386. Common at Malacca. Fine specimens attain a length of seven inches and a half, wing three and a half, and tail three and a quarter.

I. virescens, nobis. Length about six inches and a half, of wing three inches, and tail the same; bill to gape seven-eighths of an inch, and tarse eleven-sixteenths. Colour olive-green above, paler and more yellowish below, the throat inclining to albescent, and the lower tail-coverts tinged with ochreous, as is also the tail: a slight shade of the same prevails upon the crown, back, and wings. Bill dusky above, pale below; and feet light brown. Younger specimens have the throat more yellowish, and the coronal feathers are less pointed and distinct. Common in Arracan.

I. cinerea, A. Hay. For the loan of an example of this fine species I am indebted to Lord Arthur Hay. It has the Hypsipetes character of the coronal feathers more developed than in either of the others. Length about seven inches, of wing three and three-quarters, and tail three and a quarter; bill to gape seven-eighths, and tarse three-quarters of an inch. Upper parts cinereous-brown, the forehead and

<sup>\*</sup> This species will have been named by M. Temminck, as also my Tephrodornis grisola, J. A. S. XII, 180. Phænicura leucoptera, XII, 962, and Muscicapula melanoleuca, (Hodg.), XII, 940; as all of these have now been received by the Society from Java.

above the eye ashy, which also margins the pointed feathers of the crown; throat, middle of belly, and lower tail-coverts, white, the flanks and across the breast pale ash-brown. Bill and feet dusky, the latter baving apparently been brown. From Malacca.

Hypsipetes, Vigors. The species of this genus exhibit a considerable gradation: the first two being typical, with sub-furcate tail, a character which is less marked in the second. These have also coral-red bills, ashy plumage, and black crown.

- 1. H. psaroides, Vigors. Common in the Himalaya, extending to the hill ranges of Assam, Sylhet, and Arracan.
- 2. H. neilgherriensis, Jerdon. Neilgherries and Ceylon.
- 3. H. ganeesa, Sykes: figured in the 2nd series of the 'Illustrations of Ornithology', by Sir W. Jardine and Mr. Selby. This species I have never seen. It is proper to Western India, and is probably common in the Mahabuleishwa hills.
- 4. H. McClellandii, Horsfield. Bill dusky, paler below: wings and tail green, the latter nearly square, but having its two or three outermost feathers successively a trifle shorter. This species takes the same range as H. psaroides.

From the above, we pass to more aberrant species, with the bill stronger, and the tail shorter and more rounded.

- 5. H. philippensis, Strickland, An. and Mag. N. H. 1844, p. 418.
- 6. H. malaccensis, nobis. This approaches nearly to the description of the last, but has the crown of the same olive-green with the back, and no trace of rust-colour on the cheeks and chin. Length about eight inches and a half, of wing four inches, and tail three and a half, its outermost feathers a quarter of an inch less: bill to gape an inch and one-eighth; and tarse three-quarters of an inch. Upper parts dull olive-green, the wings and tail brownish-dusky, margined with the colour of the back : throat and breast ashy, with whitish centres to the feathers, the abdomen and lower tail-coverts dull white: bend of the wing underneath, and the axillaries, pale yellow. Bill and feet horncoloured. Feathers of the crown pointed, but this character is less developed than in the more typical species. In two specimens, some old unshed secondaries and wing-coverts have a rufescent tinge, but there is no trace of this in old birds. The rictal bristles are considerably more developed than in the typical species, (as in Hemixos and Iole,) while in H. McClellandii they are intermediate. Common at Malacca.



A specimen from the Nicobars is perhaps the young, having the wing but three inches and a half long, and the secondaries, tertiaries, and edges of the primaries, rufous-brown; tail slightly tinged with the same: coronal feathers tinged with dusky-ash, and less pointed; the throat and fore-neck white, tinged with yellow; and the rest of the under-parts mixed yellow and white, with olive on the sides of the breast: bill also shorter, tinged with yellow, and approaching in form to that of the next group, as indeed does the whole figure of the bird; so much so, that if the above characters prove to be permanent, I would propose for it the name Ixocincla virescens.

A form requiring, I think, distinction from Hypsipetes, may be designated

Ixocincla, nobis. It differs from Hypsipetes, in its more bulky form, stouter and more meruline bill, and in the greater size of the legs and toes; but in other respects is nearly allied.

I. olivacea, (Jardine and Selby); the female erroneously figured as Hypsipetes ganeesa, in the Itt. Orn., 1st series, pl. CLXVIII, and (as I am informed) subsequently named Hyps. olivacca in the second series of the same work, where a figure of the true H. ganeesa is given. This bird has a much more meruline aspect than in true Hypsipetes, and it is known as the Merle to the colonists of the Isle of France. Length eleven inches and a half, of wing five and threeeighths, and tail four and five-eighths; bill to gape an inch and threeeighths, and tarse an inch. Male having the upper-parts dusky, the feathers margined with dark dingy greenish; wings and tail uniform dusky-brown, the tertiaries slightly margined with ashy: cap blackish, the feathers pointed as in true Hypsipetes; lores deeper black, and a slight grey supercilium from the mostrils to the occiput, lightercoloured from the nostrils to the eye: under-parts uniform dusky ashcolour, purer on the throat, and paling on the belly and under tailcoverts, which last have a faint tinge of ferruginous : bill bright orangeyellow; and the legs appear to have been yellowish-brown. Female paler, with the greenish margins to the feathers much more developed, and the ash-colour confined to the throat, ear-coverts, and front of the neck.

Turdus borbornicus, Lath., is perhaps a second species of this type.

The generic name Brachypus, it seems, must now be abandoned, at least in Ornithology, and it appears never to have been employed in a very definite signification. At all events, very different forms of



Bulbouls have been brought together under this appellation. Swainson gives Turdus dispar, Horsf., as the type; and Gray and Gould have applied it to species of true Pycnonotus; viz. Br. leucogenys and Br. melanocephalus, Gray, in Hardwicke's 'Illustrations,' and Br. plumifer, Gould, a synonyme of the second species cited: P. leucotis, however, is referred by Gould to Ixos; and his Br. gularis would seem to be a true congener of Br. dispar, (Horsf.,) Sw. To the type of the two latter species, I shall now provisionally give the name Rubigula; and then there remains that of Lanius melanocephalus, Gm., and its congeners, for which I can find no appellation, and shall therefore designate Brachypodius.

Rubigula, nobis. There is unfortunately no specimen in the museum from which I can define this group, but of the present series it makes the nearest approach to Pycnonotus, and has the rump uniformly coloured with the back, and a subquadrate tail, unlike the next form. The species (at least in the male sex) are remarkable for the brilliant ruby, or sometimes orange-ruby, hue of the throat, the feathers of which are rigid and glistening. Three species would appear to have been ascertained.

- 1. R. dispar, (Horsfield), Lin. Tr. XIII, 150. Malay countries.
- 2. R. gularis, (Gould), Proc. Zool. Soc. 1835, p. 186: Brachypus rubineus, Jerdon. Southern India.
- 3. -R. \_\_\_\_\_, (Temminck), p. c. 382, fig. 2, as noticed in Griffith's Animal Kingdom, VI, 390. Java.

Brachypodius, nobis.

- 1. Br. entilotus, (Jardine and Selby), Ill. Orn, 2nd series. (Non vidi.) Hab. Malacca.
  - 2. Br. poiocephalus, (Jerdon). Southern India.
- 3. Br. melanocephalus, (Gmelin): Turdoides atriceps, Temminck.
  Malay countries, extending northward to Arracan and Tipperah.
- 4. Br. cinereoventris, nobis. Differs from the last in having the nape and under-parts to near the vert of a deep ash-grey, and in its tail-feathers being less deeply tipped with yellow, which is also less bright, while the green of the upper parts is darker and much less yellowish. Length of the wing three inches and a quarter. Inhabits Tipperah.

5. Br. tristis, nobis. Also allied to Br. melanocephalus, but remarkable for its very plain brown colouring. Length about seven inches, or



nearly so, of wing three and a quarter, and middle tail-feathers three inches, the outermost five-eighths of an inch shorter; bill to gape three-quarters of an inch, and tarse half an inch. Colour plain brown above, darkest on the crown, wings and tail, the caudal feathers being dusky, with pale tips to the outer ones; under-parts paler, especially on the abdomen and throat: the plumage of the rump copious, as usual, and of a dusky colour, with dull yellowish-brown terminal fringes: bill deep horn-colour, and legs brown. For permission to describe this species, I am indebted to Dr. Theodore Cantor, whose very extensive collection of Malayan birds, &c. when these come to be unpacked and examined, will doubtless yield other novelties. Br. tristis inhabits Penang, where it is not very common.

Lastly, as a very aberrant species, may be provisionally ranged

6? Br. ? criniger, A. Hay. The beak in this bird is vertically much less high than in the others, and altogether the species has a good deal the character of an Alcippe (nobis, J. A. S. XIII, 384), excepting in its very small tarsi and toes. Length about six inches, of wing two and seven-eighths, and tail the same, its outermost feathers a quarter of an inch less; bill to gape eleven-sixteenths, and tarse nine-sixteenths, the middle toe and claw but half an inch. Colour olive-green above, the coronal feathers, wings and tail, brunnescent; lores, ear-coverts, and the whole under-parts, yellowish, brightest on the belly and lower tailcoverts, passing to whitish on the centre of the throat, and mingled with olive-green on the breast and flanks: three outermost tail-feathers slightly tipped with yellowish on their inner webs. Bill dusky above, and pale below: legs and claws white. The coronal feathers are rounded, and of very different texture from those of the back; the rictal setæ are well developed; and there is a remarkable nuchal tuft of eight or ten straight black hairs, the longest of which are an inch and fiveeighths in length in the specimen examined. Inhabits Malacca. . .

Microtarsus, Eyton, Proc. Zool. Soc. 1839, p. 102. This is nearly allied to the preceding group.

1. M. melanoleucos, Eyton, ibid. Common at Malacca.

Finally, Ixodia, nobis. Allied to the last genus, and in its squared tail to Rubigula. Bill small and compressed, widening very little at base, the tip of the upper mandible but faintly emarginated, and the gape

<sup>\*</sup> Can this be the Setornis criniger of Lesson, the description of which I have not seen? It certainly ranges most properly as a distinct division.

unarmed. Rest as in Microtarsus; the head being crestless, and the coronal plumage uniform in texture with the other feathers. The lower tail-coverts of the only ascertained species are bright yellow, as in various species of Pycnonotus.

Ix. cyaniventris, (nobis,) J. A. S., XI, 792: Turdus, No. 6, Raffles, Lin. Trans. XIII, 311. Common in the vicinity of the Straits of Malacca.

The next is a very remarkable group, which begins now to exhibit a variety of species, and of generic modifications of form, which will ultimately indicate its true place in the system. Not long ago, its only ascertained representative was the Paradoxornis flavirostris of Gould: but the following may now be referred to it.

- 1. Conostoma amodius, Hodgson, J. A. S. X, 856. Nepal.
- 2. Paradoxornis flavirostris, Gould, P. Z. S. 1836, p. 17; Mag. Zool. and Bot. 1838, p. 513; Icones Avium, pl. VI: Bathyrhynchus brevirostris, McClelland, Ind. Rev. 1838, p. 513. Especially characterized, generically, by the deep sinuation of the tomiæ of its mandibles. Hab. Eastern Himalaya, and the mountains of Assam.
  - 3. Heteromorpha unicolor, Hodgson, J. A. S., XII, 448. Nepal.
- 4. H. ruficeps; Paradoxornis ruficeps, nobis, J. A. S., XI, 177. Bootan mountains, and those of Arracan: Darjeeling.

Chleuasicus, nobis, n. g. Nearly allied to Suthora, Hodgson (Ind. Rev. 1838, p. 32, and J. A. S. XII, 449), from which it is distinguished by the considerably larger proportionate size of the legs, and by the rather larger and decidedly broader bill, the outline of which (as seen laterally) is still more tumid and anomalous-looking. Rest as in the other genera of the group.

5. Chl. ruficeps, nobis. Length five inches and a half, of which the tail measures two and three quarters; wing two and five-eighths; bill to forehead (through the feathers) three-eighths of an inch in a straight line; and tarse seven-eighths; the latter, with the toes and claws, thicker and stouter than in Suthora. Colour as in my Heteromorpha ruficeps, but the under-parts white, or less tinged with rufescent : i. e. the head and neck are bright ferruginous; the rest of the upper parts olive-brown, more or less inclining to ferruginous, especially towards the shoulder of the wing; and the entire under-parts are white: bill whitish horn-colour, apparently tinged with green in the recent spe-. cimen; and the legs appear to have been greenish-plumbeous. From Darjeeling.



- 6. Suthora nipalensis, Hodgson. Nepal, Darjeeling.
- 7. S. fulvifrons, Hodgson. Length five inches, of which the tail measures two and a half, its outermost feathers an inch and a quarter less; wing two inches and one-eighth; bill to forehead (through the feathers) a quarter of an inch; and tarse three-quarters. Upper parts light rufescent-brown, inclining to fulvous on the forehead, throat, and breast, with a broad pale duskyish streak along each sinciput; secondaries, and base of caudals, broadly margined with bright chesnut-fulvous; the belly and flanks albescent-greyish. Bill pale, dusky along ridge of upper mandible; and legs light brown. From Nepal.

In XII, 443, I expressed an opinion that the division Heteromorpha, Hodgson, should merge in Paradoxornis; but I have since seen Mr. Gould's figure of P. flavirostris in the Icones Avium, which induces me now to follow Mr. Hodgson's arrangement, and also to refer No. 4 of the above list to his genus Heteromorpha.

The Indian Nuthatches and Tree-creepers may be enumerated as follow:—

- 1. Sitta formosa, nobis, J. A. S. XII, 938, 1007. Darjeeling. Beak scarcely at all compressed, and tapering almost evenly from the base, as seen from above.
- 2. S. himalayana, Jardine and Selby, Ill. Orn. 1st series, pl. CLXIV; to which I suspect must be referred S. cinnamoventris, nobis, J. A. S. XI, 459, though it does not quite accord either with the figure or description. The sexes differ as in S. castaneoventris, but the under-parts of the male are not quite so dark as in the corresponding sex of that species; and the deep rufous-brown colouring extends up to the throat, and in some specimens leaves little white on the chin, but the sides of the throat over the jaw are always white, as equally in S. castaneoventris. S. himalayana is stated to have the tail black, except its middle pair of feathers, the rest having "the basal half [probably a mistake] of the inner webs white; on the outer feather there is an oblique white bar, and the second has a round white spot on the tip of the inner web." In S. cinnamoventris, the outermost tail-feather has an oblique white bar towards the middle of its external web, and a larger white spot near the extremity of its inner web; and the next two feathers have each a successively smaller spot on their inner webs; the bill also is much longer than that of S. himalayana is represented in the figure, and is black with more or



less white at base; and the legs are certainly not yellow, as those of S. himalayana are coloured in the plate, but appear to have been plumbeous, with yellow on the soles. Another discrepancy of S. cinnamoventris with the figure of S. himalayana, consists in the black of the loral region not extending upon the forehead, whereas it would appear represented to do so in the figure of the other. Nevertheless, I still suspect that they will prove identical. As for the Indian Nuthatch of Latham (Gen. Hist. IV, 73), it is not very clear to which species this is to be referred. The beak of S. cinnamoventris is distinctly compressed, but broad and stout. It appears to be peculiar to the Himalaya.

- 3. S. nipalensis, Hodgson, J. A. S. V, 779. Himalaya. A small species, with remarkably short bill, tapering evenly from the base, as viewed from above.
- 4. S. castaneoventris, Franklin, P. Z. S. 1831, p. 121; J. and S., Ill. Orn. 1st series, pl. CLXV. Hilly regions of the Indian peninsula, extending to the Rajmahl district of Bengal. Bill very much compressed and narrow.
- 5. Dendrophila frontalis, (Horsf.) Swainson: Sitta corallina, Hodgson, J. A. S. V, 779. Hilly parts of India generally, from the Himalaya southward, and also of the Malay countries: common in Arracan.
- A D. flavipes is likewise alluded to by Mr. Swainson in his 'Classification of Birds', p. 318, citing "pt. V, No. 130," it may be presumed of Temminck's Planches coloriées.
- 6. Tichodroma muraria, (L.) Illiger. The Rock or Wall Creeper of Southern Europe. Common in the Himalaya, as also in Western Asia. Mr. Vigne remarks, that it "is found throughout the Alpine Punjab, displaying the delicate scarler patch upon its grey wings, as it flits over the perpendicular banks, with the movements of a butterfly rather than of a bird." Travels in Kashmir, &c. II, 20.
  - 7. Certhia himalayana, Vigors, P. Z. S. 1831, p. 174.
- 8. C. discolor, nobis. Distinguished by having the entire underparts uniform dingy brown, or very much sullied albescent (inclining in some to whitish on the abdominal region), and no ferruginous on the flanks, but only on the lower tail-coverts; whereas in the preceding species the under-parts are pure white, tinged with ferruginous on the sides of the breast, and the flanks as well as the lower tail-coverts are deep ferruginous: the upper-parts also are a shade less rufous than in

C. himalayana, and the pale central spots to the feathers are more diffused (i. e. much less defined), especially those of the head. Upon a first view, it might be thought that the under-parts of C. discolor are merely dirty; but the colour is not to be washed out, and five specimens before me are all quite similar, while in three Nepal specimens of the other the white is alike pure, and the flanks deep ferruginous. It is indeed possible that neither of these is the true C. himalayana, in which case the Nepal species might be designated C. nipalensis, Hodgson. C. discolor is common at Darjeeling.

There is a Certhia spilonota, Franklin, P. Z. S. 1831, p. 121, with "tail soft and flexible (!), in which respect it differs from the type of the genus, but it agrees in all others." It therefore cannot, however, be properly classed in Certhia, and requires to be re-examined. Neither Mr. Jerdon nor myself have been able to identify it. "C. supra grisco-fusco, albo maculata; capite albo graciliter striato; gula abdomineque albidis, hoc fusco fasciato; cauda albo fuscoque fasciata. Longitudo 5½ unc." Major Franklin's specimens were collected on the Ganges between Calcutta and Benares, and in the Vindhyian hills between the latter place and Gurrah Mundelah, on the Nerbudda.

Accentor mollis, nobis. This fourth species of Himalayan Accentor (vide J. A. S. XII, 958 et seq.,) is about six inches long, of which the tail occupies two and a half; wing three and a quarter; bill to frontal feathers five-sixteenths of an inch; and tarse three-quarters of an inch. Colouring soft and delicate. Upper parts a rich brown, passing into pure dark ash-colour on the head and neck, and into maronne on the scapularies and tertiaries, and less deeply on the hind part of the back; coverts of the secondaries pure dark grey, those of the primaries, with the winglet, black, as are also the primaries, these last having their unemarginated portion externally bordered with pale grey; tail greyish-dusky; frontal feathers to above the eyes margined with white, the lores blackish, and the entire under-parts slightly embrowned deep ashcolour, as far as the vent, which is pale and tinged with ferruginous, the under tail-coverts being deeper ferruginous, and the hind portion of the flanks dark ferruginous: bill blackish; and feet pale, having probably been tinged with yellow. From Darjeeling.

"The species of this genus," remarked Mr. Yarrell not long ago, "are very limited in number, only five, I believe, being at present known. Two are figured in this work ['History of British Birds,'] as belonging

No. 164. to England [one of these, however, being there only known as an excessively rare straggler]; two others are found in the north and east of Europe\*; and a fifth has been received from the Himalaya mountains. M. Temminck includes A. alpinus in his catalogue of the birds of Japan." The discovery of four Himalayan species, all different from those of Europe, is accordingly no small accession to the known species of the present group; and it is likely that the mountain ranges of

Central Asia will be found to yield several more.

Locustella rubescens, nobis. Without having a specimen of the British L. Raii for comparison, I sufficiently well remember that bird (of which I have shot many) to be enabled to state that the present one is a true Locustelle, having merely a rather shorter tail, and the legs (I think) are somewhat stouter than in its British congener. The general characters, however, are quite the same. Length six inches, by seven and three-quarters in spread of wing; the closed wing two inches and a half; and tail two inches, its outermost feathers half an inch less; bill to gape three-quarters of an inch, and tarse seveneighths. Irides dark hazel. Bill dusky horn, pale at base of lower mandible; and legs light brown. Colour of the back ruddy-brown, with black centres to feathers; of the crown dusky, with olivaceous lateral margins to each feather; sides of neck plain olivaceous, as are also those of the breast; throat and belly white, the front of the neck tinged with fulvescent-brown, which is likewise the hue of the flanks; lower tail-coverts fulvescent-brown, the longer of them darker with whitish tips; rump and tail dark ruddy-brown, all but the middle feathers of the latter slightly tipped with grey, with traces of barred markings of the same underneath; wings dusky, the coverts margined with olivaceous, and the large alars with ruddy-brown; tips of the tertiaries a little albescent; a narrow whitish line from bill to occiput, and slight medial dusky lines on the hindmost feathers of the flanks. A single specimen of this bird was shot in the neighbourhood of Calcutta, in the month of March. On dissection, the muscles of its legs were observed to be very thick, with stiff rigid tendons, as in the British Locustelle.

<sup>\*</sup> Surely that of northern Europe here alluded to, is not the so-called A. calliope of M. Temminck, v. Calliope camtschatkensis, (Lath.)?: a bird common in Lower Bengal during the cold season, but certainly having no particular affinity for Accentor.

Tribura luteoventris, Hodgson. Nearly allied in form to the preceding, but the tail much more graduated (as in Locustella Raii), and the bill rather more compressed, with the ridge of the upper mandible more decidedly raised and acute towards its base. I suspect that it pertains to the division Pseudoluscinia, Bonap. Length about five inches and a half, of which the middle tail-feathers measure two and a half, the outermost being an inch shorter; wing two inches; bill to gape nine-sixteenths of an inch, the latter quite smooth (as in Locustella); tarse three-quarters of an inch; claws fine, and but moderately curved, the hind-claw measuring half an inch. Upper parts uniform olive-brown; the lower paler, except the flanks, which are also a little rufescent; throat and middle of the breast and belly inclining to whitish; bill dark horn-coloured above, and pale below; and legs light brown. Inhabits the Kachar region of Nepal.

Mr. Hodgson gives the following generic characters of his Tribura. Bill equal to the head (measured to gape), straight, compressed, at base high as broad, with the ridge raised and keeled between the oval nares: tip of upper mandible very slightly inclined, but distinctly (though minutely) notched: rictus quite smooth. Wings short and rounded, the two first quills conspicuously and equally gradated, the three next subequal and longest. Tail somewhat elongated and gradated equally throughout, rather cuneated than fan-shaped. Tarse medial, stout [or rather, of moderate strength], smooth, longer than the middle toe and nail: toes and nails slender and simple, compressed and elongate; inner lateral with its nail exceeding the outer; the hind toe least, and not broad. Feet of terrene model,"—being much as in the British Locustelle, which bird I have seen on the ground, among furze bushes, I think with an ambulatory gait.

Dumeticola, nobis, n. g. A specimen sent by Mr. Hodgson with the MS. name Salicaria affinis, would fall under M. Temminck's division of Bec-fins aquatiques, but would scarcely have been referred by Mr. Selby to his Salicaria (now dismembered, and its component species assigned to previously established divisions). Nearly allied to the last species, it departs further from the Salicaria model, and approaches more to that of Prinia, and especially of Horeites (hereinafter described): having comparatively full and puffy plumage, and a less cuneated tail, inasmuch as the three middle pairs of feathers graduate but slightly; the first primary is also rather shorter, and the second rather



longer, than in Tribura (v. Pseudoluscinia?) luteoventris. The bill is shaped somewhat as in Cinclus, but is proportionately shorter, with the peculiarities of that form less developed; the nareal apertures are quite basal; and the gape smooth, as in the preceding: feet also similar, but the claws slightly longer and straighter.

D. thoracica, nobis. Length five inches, of which the tail measures two inches, its outermost feathers seven-eighths of an inch less; wing two and one-sixteenth; bill to frontal feathers three-eighths of an inch, and to gape above half an inch; tarse three-quarters, and hind claw five-sixths of an inch. Upper-parts dark olive-brown, with a faint ruddy tinge on the lower part of the back; throat and above the lores white, passing into ashy on the breast, which, with the fore-neck, is marked with largish round dusky spots; lower portion and sides of the breast plain brownish-ashy, the medial portion of the belly white, and the flanks fulvescent-brown; under tail-coverts dark olive-brown, with whitish tips: bill dusky, and legs and claws pale. Inhabits Nepal.

Horornis, Hodgson, is placed by that naturalist as a subgenus of his Tribura (Pseudoluscinia? Bonap.), having "the bill feebler, and the tarse sometimes distinctly scutellated: wings and tail as in Nivicola" (note to p. 585).—I have a hasty note of the second species below described, (from a specimen taken to England by Mr. Hodgson,) as being "intermediate to Prinia and Tesia, having the bill slender and compressed, much as in Locustella, with the rictorial hairs scarcely perceptible; tail rather short, and much graduated; wings the same, the first quill but half the length of the second, the fourth and fifth equal and longest, a little exceeding the third and sixth."

H. flaviventris, Hodgson. (Non vidi.) "Above olive-green, below pale yellow; chin and line over eye albescent; legs fleshy; bill dusky-brown. Length four inches and three-eighths; bill half an inch; tail an inch and five-eighths; wing under two inches; tarse thirteensixteenths; central toe and nail eleven-sixteenths; hind nine-sixteenths. Hab. the Cachar, or juxta-Himalayan region of the hills."

H. fortipes, Hodgson. "Bill slender, with notch and inclination distinct; rictal hairs distinct. Tail broad, soft, fan-shaped. Legs strong, and frequently smooth. Wing as in Tribura, more or less pointed, and not absolutely rounded as in Horeites. Above olivebrown; below white: the flanks, vent, and eye-brows, yellowish. Legs and bill fleshy-white; the bill more sordid. Length four inches



and five-eighths; bill half an inch; tail under two inches; wing two and one-sixteenth; tarse above fifteen-sixteenths; central toe and nail eleven-sixteenths; hind nine-sixteenths. Hab, the Cachar," Hodgson's MSS ——. The following description was taken by myself from the specimen before alluded to. Length about four inches and a quarter, of wing two inches, and tail an inch and a half, its outermost feather half an inch shorter: bill to gape five-eighths of an inch; and tarse three-quarters of an inch. Colour uniform dark olive-brown above, below pale ochraceous-brown, approaching to albescent; flanks and lower tail-coverts dark brown, the latter margined paler; bill dusky above, below paler; legs also pale.

Horeites, Hodgson. "Bill shorter than head, quite straight, usually distinctly notching; nares covered with a scale. Wing as in Prinia. Tarse high, as in Prinia, but the toes less repent, ambulant in fact, with the laterals equal and freer, and the central longer; nails slender and Sylvian, not Parian as in Orthotomus. Tail short [or rather, I should say, of moderate length], narrow [I should rather term it somewhat broad], rounded as in Orthotomus, but without the Merops-like elongation of the centrals." Hodgson's MSS.—According to my ideas, these birds approach a good deal to the genus Tesia, particularly to T. flaviventris; but have a more slender bill, a well developed, cuneiform, broad and soft, tail the feathers of which are much graduated, and the general character tends distinctly towards Pseudoluscinia and its allies. Mr. Hodgson describes two alleged species, "exclusively confined to the northern region of the hills, near the snows."

H. brunnifrons, Hodgson. "Above olive-brown, [slightly] redder on wings and tail; cap red-brown. Below sordid white [pale ashy], pure centrally. [Bill dusky above, pale beneath; and the legs pale.] Length four inches; bill half an inch; tail an inch and five-eighths; wing the same [varying from this to nearly two inches]; tarse three-quarters; central toe and nail five-eighths; hind seven-sixteenths."

H. pollicaris, Hodgson. "Above dark olive, below and the eye-brow yellowish. Legs and bill fleshy-grey. Length three inches and a half; bill seven-sixteenths; tail an inch and five-eighths; wing the same; tarse thirteen-sixteenths; central toe and nail five-eighths; hind half an inch. Has a slender, Regulus-like, bill, and very short, extremely rounded, wings. Its tarse is remarkably elevate, and scutellate

to the front, and its toes are compressed and ambulant, but with a remarkably large thumb for such a foot." From a specimen taken to England by Mr. Hodgson, I took the following note.—" Probably only the young of H. brunnifrons, from the adults of which it differs in the colour of the head being uniform with that of the back, and the under-parts less albescent and devoid of any asby tinge, being slightly washed with yellowish. "These birds constitute a nivicolan or northern hill group, representing the Priniæ of the plains of India." Hodgson's MSS.\*

Tesia, Hodgson (February, 1837): Microura, Gould (August, 1837). Of this curious genus, the following species may now be enumerated.

- 1. T. cyaniventer, Hodgson, J. A. S., VI., 101: Saxicola? olivea, McClelland and Horsfield, P. Z. S., 1839, p. 161. Bright olive-green above, slaty below. Nepal, Darjeeling, Assam.
- 2. T. castaneo-coronata, (Burton), P Z. S. 1835, p. 152: T. flaviventer, Hodgson, 1837. Bright olive-green above, vivid yellow below, with the crown and ear-coverts a lively reddish-chesnut. Nepal.
- 3. T. squamata, (Gould). Icones Avium: var. A, T. rufiventer, Hodgson, J. A. S. VI, 102; Var. B, T. albiventer, Hodgson, ibid.; Var. C, T. concolor, Hodgson, MS. I believe these to be all different phases of plumage of the same species, and therefore venture upon

\* The following, to judge from specimens presented to the Society by Mr. Hodgson, so far from being generically different, appears to me to be identical in species with Horeites brunnifrons, presenting at most but an individual diversity, such as may commonly be seen in different specimens of Prinia inornata, or Cysticola cursitans, shot out of the same little society; but I nevertheless give Mr. Hodgson's diagnosis, as follows:—

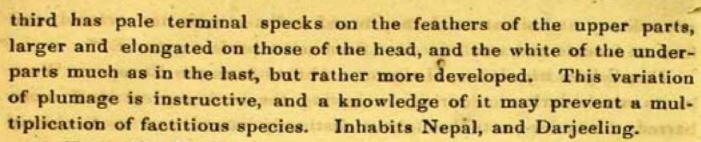
Nivicola, Hodgson, "Bill still shorter, feebler, Regulus-like, with the notch evanescent: wings and tail broader, firmer, ampler than in any of the above: tail fan-like. Wings not absolutely round; the fifth quill longest; the two first nearly, the next little, and both inter se equally, gradated. Tarse medial: toes simple,

ambulant. Habitat the Cachar, near the snows.

N. schistilata, H. Above olive-brown, below white, and laterally pale slaty-blue. Legs fleshy, bill pale. Cap on crown brunnescent. Coloured very like our Horeites brunnifrons, but decidedly different in structure, with longer wings, broader and firmer tail, and more ambulant feet, of which the central digit is long, the laterals equal and nearly free, and the hind least and compressed. Length four inches and a quarter; bill half an inch; tail two and one-sixteenth; wing one and fifteen-sixteenths; central toe and nail ten-sixteenths; hind half an inch, or less." Hodgson's MSS.



adopting the specific name bestowed by Mr. Gould, in preference to either of those given by Mr. Hodgson, as being alone applicable to the species generally. However stringently rules may be drawn up, such as the very excellent "Series of Propositions for rendering the Nomenclature of Zoology uniform and permanent," adopted as the Report of a Committee appointed by the 'British Association' for the consideration of this subject, cases will still arise, now and then, in which a naturalist must rely upon his own judgment, and indeed the present one may be brought under § 11 of the "Propositions," by which "a name may be changed when it implies a false proposition which is likely to propagate important errors." For a precedent, I cite the Neomorpha Gouldii of Mr. G. R. Gray, it having been ascertained that the N. acutirostris and N. crassirostris of Gould were merely the different sexes of the same bird. At the same time, I most fully concur in the remark, that "this privilege is very liable to abuse, and ought therefore to be applied only in extreme cases, and with great caution." In the present instance, it may be justly urged in favour of Mr. Gould's specific name, that the bird having been figured by that naturalist as Microura squamata, it is already better known by that denomination than by any other, and that the proposed alteration, so far from being likely to induce confusion, is, on the contrary, calculated to remove a source of error, such as would result from the exclusive adoption of either of Mr. Hodgson's appellations to the species in all its phases. I might even have hesitated in proposing an entirely new name for the bird in question; but that given by Mr. Gould has not only already obtained currency, but was besides very nearly contemporaneous with the partially applicable ones bestowed by Mr. Hodgson. Certainly, the characters and dimensions of the three alleged species correspond exactly; and it will be seen that Mr. Gould's second figure represents a specimen just midway between T. albiventer and T. rufiventer, while an example presented to the Society by Mr. Hodgson of his T. concolor, is of a uniform brown colour all over, with a slight ashy shade on the under parts; but retains two or three white-margined feathers on the breast resembling those of ordinary albiventer, with which it quite accords in all other particulars, and is decidedly of the same species. A second specimen is plain brown above, with white throat, and white margins to the feathers of the breast and belly, decreasing on those of the flanks. A



- 4. T. pusilla, Hodgson, n. s. Size and proportions of the next, but the bill rather longer, and the tail barely exceeding half an inch. In general aspect it much resembles the rufiventer variety of the last. Upper parts dark brown, the wing-coverts having terminal pale dots: lores and under parts of a light wood-brown, the feathers slightly margined with black; those of the flanks chiefly dark, with brown margins, and the extreme edge black, like the rest. Bill dusky above, and legs horn-brown. Inhabits Nepal.
- 5. T. caudata, nobis. Length three inches and five-eighths, of which the tail measures an inch, being considerably more developed than in the other species of analogous tone of colouring; wing an inch and three-quarters; bill to forehead seven-sixteenths, and tarse eleven-sixteenths. Upper parts dark and rich olive-brown, the feathers very slightly margined with black, and having also black shafts; throat ferruginous, paling on the breast, where the feathers have black centres and are further tipped with black; the belly similarly marked with dusky-black and white: wings uniform dark reddish-brown; and tail inclining to the same, being also very soft and flexible: lores and orbital region ash-grey: bill blackish; and legs brown. From Darjeeling.

To these may be added the Troglodytes microurus of Ruppell, which shews the form to be likewise African.

Mr. Hodgson proposes to restrict Tesia to T. cyaniventer and T. flaviventer, and applies a new name to the others, which, however, if deemed separable, would rank under Microura of Gould: unless, indeed, the latter be pre-occupied, in which case the name Pnoëpyga, Hodgson, would be admissible. The two species cited have a more developed tail; but so has my T. caudata, which nevertheless decidedly belongs to the Microura section; and Mr. Hodgson further points out that T. cyaniventer has the bill flatter at base, while in T. flaviventer the nareal scale, conspicuous in the others, is barely traceable: nevertheless, I do not see that they can be justifiably separated. According to the same naturalist, "these singular birds are solely mountaineers, dwelling in humid retired woods, where under-cover abounds. They

CONTRALLIBRAN

are solitary and silent; and they breed and nestle on the ground, and feed on insects and small seeds. Stomach a perfect gizzard."\*

Troglodytes nipalensis, Hodgson. Differs from the European Wren in its much darker colouring, in having the back a great deal more barred, the under-parts throughout distinctly barred, and more closely so than the upper-parts, and the bill somewhat shorter and a little more widened at base. Length of wing an inch and seven-eighths. Nepal.

T. punctatus, nobis. Size of the European species: the bill shorter, and vertically much deeper. Length of wing an inch and three-quarters, and of tail an inch and a quarter. Upper parts fuscous-brown, with a pale speck at the extremity of each feather, some of these specks being white or nearly so; tail barred as in the European Wren, but the feathers softer and more graduated; tertiaries comparatively broad, their ground-colour a dark mahogany, as is likewise the colour of the bars on the outer webs of the primaries. Under-parts delicately mottled, a good deal in the manner of the scapularies of a Wryneck (Yunx torquilla), but the pale spots much more numerous on the breast, and nearly obsolete on the belly, which last has a fulvous tinge. Bill dark horny; and the legs appear to have been pale. Inhabits Darjeeling.

Orthotomus cineraceus, nobis. This nearly approaches the Orth. edela, (Tem., v. Edela ruficeps of Lesson, and Motacilla sepium of Raffles, nec Orth. sepium, Horsf., vide J. A. S. XIII, 378), except that the upper-parts are pure ash-grey, without any tinge of green, whereas in Orth. edela, according to Raffles, the "back, wings, and tail," are "dusky green." The forehead and sides of the head are light ferruginous, palest on the cheeks, and there is a slight tinge of the same upon the chin; crown tinged with olive-brown; lower parts white, passing to light ashy on the sides of the breast; tail somewhat brownish, with terminal dusky band, and whitish extreme tips to its

<sup>•</sup> There is an allied (or rather, analogous,) South American form, which, I understand, is the Leptorhynchus of Menetries, but which name is pre-occupied; and the following species of it appears to be undescribed, in which case it may bear the specific name subluteoventris. Length two inches and seven-eighths; of wing one and five-eighths; tail five-eighths: bill to gape nearly five-eighths; and tarse the same, being with the toes much smaller than in Tesia. Upper-parts black, the feathers laterally margined with light brownish-yellow; lower-parts clear yellowish-white, whitish on the throat; a dark line from base of lower mandible; and central dark lines to the feathers of the sides of the neck, and of the fore-part of the breast. Bill dusky above, pale beneath; and legs albescent-plumbeous. Probably from Guiana.

outer feathers; tibial plumes rust-coloured, the tarsi and toes redbrown, and bill dusky above, the lower mandible pale. The middle tail-feathers are not elongated in the only specimen under examination. Length about four inches and a half, the wing an inch and thirteen-sixteenths, and tail one and five-eighths; bill to gape three-quarters of an inch, and tarse five-eighths. Common at Malacca.

Prinia, Horsfield. Of this genus, I have no species to describe additional to those noticed in Vol. XIII, p. 376, but may remark that Mr. Jerdon considers that two or three are at present confounded under Pr. inornata: considerable variation, however, certainly obtains in individuals shot out of the same flock; and it may be noted that this bird extends its range into Arracan. Pr. Franklini, nobis, (v. macroura, Franklin, nec Latham), being the Sylvia longicaudata of Tickell, J. A. S. II, 576, will now bear that as its specific name: and Pr. cursitans, Franklin, as I am informed by Mr. Strickland, "is decidedly congeneric with the European Cisticola schwnicola, but differs in being more rufous, &c. I have compared them," he adds, and it may be further noticed that the cursitans is common in Lower Bengal.\*

Neornis, Hodgson. This name was applied by Mr. Hodgson to my Culicipeta (J. A. S. XII, 968), but he has since referred to it two alleged species as aberrant representatives of the form, which appear to me to have an obvious claim to typify a distinct genus, in denomination of which I propose that the above name should be retained. General form of Prinia, but with the bill and the colouring of Phylloscopus, and long hair-like rictal setæ.

N. flavolivacea, Hodgson. "Above olive-green; below and the eye-brow, luteous-yellow [dull pale yellowish]. Length five inches; bill half an inch; tail two inches and three-eighths; wing two and five-sixteenths; tarse five-sixteenths; central toe and nail five-eighths; hind nine-sixteenths." Hodgson's MSS. Bill dusky, base of lower mandible pale; legs brown, the tarse pale externally. Nepal.

N. cacharensis, Hodgson. "Above luteous-olive; below buff; eyebrow pale. Length four inches and three-quarters; bill nine-sixteenths; wing two inches: tarse seven-eighths; central toe and nail

<sup>\*</sup> Since the above was written, I have seen three specimens of Pr. socialis from Agra, which, though similar in plumage, are smaller than one sent by Mr. Jerdon from S. India, and have the bill considerably smaller.—A species very closely allied to (i indeed different from) Pr. sylvatica, Jerdon, has also been received from Java.



five-eighths; hind half an inch." Ibid. N. B. I greatly suspect that this is merely the young of the preceding, from comparing a specimen sent by Mr. Hodgson of the latter, with a description I took of the former from a specimen which that naturalist took with him to England.

The *Prinia olivacea* and *Pr. icterica*, Strickland, *P. Z. S.*, June, 1844, are two species from Fernando Po, which are probably referable to this type.

Phylloscopus, Boie. This genus is greatly developed in India, and the species may be ranged into three sections.

Firstly, those immediately allied to Ph. trochilus, &c. of Europe, of which I have already described six, as occurring in the vicinity of Calcutta during the cold season. These are,—1. Ph. fuscatus, nobis, J. A. S. XI, 113. Of this I have now obtained several specimens, and one or two have been forwarded from Arracan,—2. Ph. javanicus, (? Horsf.); Ph. magnirostris, nobis, J. A. S. XII, 966. Rare in the neighbourhood of Calcutta, and occurs likewise in Arracan,—3. Ph. lugubris, nobis, XII, 968. Common, and also occurs in Southern India,—4. Ph. viridanus, nobis, XII, 967. Very common, and abundant also in the Himalaya and in Arracan,—5. Ph. tristis, nobis, XII, 966. Common in swampy places, wherever there is jungle; and diffused generally over India,\*—6. Ph. nitidus, nobis, XII, 965. India generally. To these may now be added—

7. Ph. brunneus, nobis. Length about four inches, of wing two and three-sixteenths, and tail one and three-quarters; bill to gape exceeding half an inch, and tarse three-quarters. A plain brown species, distinguishable from Ph. tristis by the more cinerascent shade of its upper parts, by the absence of any yellow on the axillaries and beneath the shoulder of the wing, which is replaced by faint rufous, by the pale colour of the lower mandible and of the legs, and by the shape of its tail, of which the outermost feathers are a quarter of an inch shorter than the middle ones; lower parts brownish-albescent. From Arracan, where procured by Captain Phayre.

8. Ph. affinis, (Tickell), J. A. S. II, 576: Sylvia indica, Jerdon. Indian peninsula. (Non vidi, and the identification of these is due to Mr. Jerdon.)

<sup>\*</sup> I also found this species in great abundance in a mange tope near Hooghly, where there was no marshy ground in the immediate vicinity.

There are others in the Himalaya, which I formerly considered identical with Ph. trochilus and Ph. rufa of Europe; but I had no specimens of the latter to compare them with. Ph. trochilus is stated by Mr. Gould to have been received from Western India, and by M. Temminck from Japan; and Ph. sibilatrix is enumerated in Dr. Royle's list, but the allied Ph. nitidus may have been mistaken for it. The species of this genus require very minute examination.

Mr. Hodgson separates those which have a pale coronal mesial line, and, in some instances only, rather a thicker bill, approaching in form to that of *Phyllopneuste*, by the same *Abrornis*. I can only regard them as forming a slight section of the genus: and the next might form an analogous third section.

Ph. schisticeps, (Hodgson). Resembles Culicipeta Burkii (J. A. S. XII, 968, v. Muscicapa bilineata, Lesson, v. Cryptolopha auricapitla, Swainson,) in colouring, except that the head and nape are uniform deep ash-grey; having the rest of the upper-parts bright yellowish-green, the entire under-parts deep yellow, and the two outer tail-feathers white on their inner web: the bill, however, is not depressed, as in the Culicipeta, but is thicker than usual (approaching in this respect to Phyllopneuste), and comparatively short: the claws also are shorter, stronger, and more hooked, than in Culicipeta, better adapted for clinging, as in other Phylloscopi. Length about four inches and a quarter, of wing two inches to two and one-eighth, and of tail an inch and five-eighths; bill to gape half an inch; and tarse five-eighths: colour of bill blackish above, yellow below; and of feet yellowish. The young have looser plumage, and all the colours less intense. Inhabits the Himalaya, and the mountainous parts of Arracan.

Of the species with pale mesial coronal streak, I have already described Ph. reguloides, J. A. S. XI, 191, and XII, 963,—and Ph. modestus, (Gould), ibid.,—both of which occur likewise in the Himalaya and in Southern India, and the latter in Arracan. To these may now be added—

Ph. pulcher, (Hodgson). Allied to Ph. modestus, but larger, and distinguished by having the three outer tail-feathers wholly white, with the exception of the terminal half of their outer webs, together with the tip of the inner web of the ante-penultimate, and slightly of the penultimate feathers. Colour of the upper-parts dark olive-green, with a rufous cast, and two pale rufescent bars across the wings;

beneath dingy pale green; a light streak over the eye, and trace of another upon the centre of the crown. Bill dark above, and pale beneath; the feet brown. Length about four inches and one-eighth, of which the tail measures an inch and five-eighths; wing two and three-eighths, the space between the tips of the first and second primaries three-quarters of an inch: bill to gape half an inch; and tarse nearly three-quarters. Inhabits Nepal.

Abrornis castaniceps, Hodgson. "Above vernal-green: belly, vent, and croup, deep yellow. Chin to belly white, passing laterally to soft plumbeous. Top of head chesnut, bounded by black to sides. Legs and bill pale. Length four inches; bill three-eighths; tail an inch and five-eighths; wing one and fifteen-sixteenths; tarse three-quarters; central toe and nail seven-sixteenths; hind five-sixteenths of an inch." Nepal. (Non vidi.)

Phyllopneuste, Meyer, 1822: Ficedula, Koch, 1811. The latter term, though having the priority, is objectionable as conveying the idea that these birds are fruit-eaters, like the Fauvettes, which decidedly is not the case.

Ph. indicus, nobis. Nearly allied to the European Ph. hippolais, termed Hippolais salicaria by the Prince of Canino, and Sylvia polyglotta by Vieillot. Length about five inches and a half, or nearly so; of wing two and five-eighths to two and three-quarters, its first primary measuring three-quarters of an inch, and the second an inch and one-eighth more, and reaching to within three-eighths of an inch of the extremity of the wing; tail two inches and a quarter; bill to gape five-eighths; and tarse three-quarters of an inch. Colour dark olive-green above, a little infuscated, especially upon the crown, with a well defined dull pale yellow supercilium; breast tinged with ashy, mingled with dull pale yellowish, the rest of the under-parts dull yellowish-albescent; a slight band on the wing formed by the pale yellowish tips of some of the greater coverts: bill dusky above, and in part below, the rest yellowish, with conspicuous hair-like rictal setæ; and the legs appear to have been pale leaden. Sent from Nepal by Mr. Hodgson, and from Southern India by Mr. Jerdon.

2. Ph occipitalis, Jerdon. Smaller and paler, with a light yellowish mark on the middle of the occiput, flanked on either side with blackish, and then with pale yellowish-green, continued as a superciliary streak from the bill; the first of these markings corresponding with the termination of the coronal streaks of Culicipeta Burkii, of Phylloscopus reguloides, and of certain other species of the latter genus. Colour ashy-green, purer green on the wings and rump; a slight whitish cross-band on the wing, formed by the tips of the greater coverts; lower-parts dull albescent throughout; shoulders of the wings inferiorly, with the axillaries, yellow: bill duskyish above, pale yellow below; and legs yellowish-brown. Length four inches and three-quarters, of which the tail is an inch and seven eighths; wing two inches and three-quarters; bill to gape five-eighths; tarse eleven-sixteenths. Southern India, where discovered by Mr. Jerdon.

3. Ph. rama, (Sykes), P. Z. S. 1832, p. 89. Common in Southern India.\*

Calamoherpe, Boie (1822). Three species of this genus are common in Bengal, and it would seem over India generally; visiting the plains, however, only during the cold season.

- 1. C. arundinacea, (? Lin.)+: Sylvia turdoides, Tem.; Agrobates brunnescens, Jerdon. This bird requires, however, to be actually compared with European specimens. Length of a female seven inches and three-quarters, by ten and a half in expanse; wing three and five-eighths; tail three and three-eighths; bill to gape an inch and one-sixteenth; and tarse one and one-eighth.
- 2. C. montana, (Horsfield). Very common, and comes a good deal into gardens, frequenting pea-rows and the like. In wilder marshy districts, such as the swampy thickets in the vicinity of the salt-water lake near Calcutta, not one is to be met with, while both the other species abound; and the next is rarely seen in the haunts of C. montana. Prinia flaviventris and Phylloscopus tristis frequent the same places as C. agricola, but keep more to the higher jungle where there happens to be any; and I have observed no other Phylloscopus or Prinia in the localities proper to those above mentioned. C. montana measures five inches and three-quarters, by seven and a quarter; wing

† Prof. Behn assures me, that this is certainly distinct from Turdus arundinaceus, Lin., of Europe; in which case it must stand as C. brunnescens, (Jerdon).

<sup>\*</sup> I have just been looking over the series of these birds with Lord Arthur Hay, and it is his lordship's opinion that nitidus should be referred to Phyllopneuste, (in which case I believe that the British sibilatrix should accompany it,) and that reguloides and pulcher should rank in Culicipeta; which, I think, would certainly bring schisticeps into the same division. His lordship does not quite agree with me in referring modestus to Phylloscopus, but I cannot bring myself to accede to placing this last bird as a Regulus.

two inches and a quarter to two and three-eighths; tail two and a quarter: bill to gape three-quarters; and tarse seven-eighths of an inch. As compared with the British C. salicaria, (Sylvia arundinacea, apud Temminck,) the tinge of the upper-parts, breast and flanks, is much less brown, and the beak is less compressed, although vertically deeper. The next species has a nearer affinity for the British bird, both in form and colouring; but is smaller, with a distinctly smaller bill, and the supercilium is carried backward beyond the eye, which is not the case in C. salicaria.

3. C. agricola, Jerdon. Less than the preceding, with a proportionally smaller bill, and more rufous colouring. Length four inches and a half, by six and seven-eighths; wing two and a quarter; tail the same; bill to gape five-eighths; and tarse seven-eighths. A specimen procured at Cabool by the late Sir Alexander Burnes agrees perfectly with others obtained near Calcutta and in Southern India.

Arundinax, nobis. This genus was first detected by Mr. Jerdon, among a number of specimens of Calamoherpe arundinacea (?), which the only species as yet ascertained a good deal resembles, on a superficial view. Several specimens were soon after procured by myself in the vicinity of Calcutta; and Captain Abbott also sent it from Ramree, Arracan. Its true affinity, however, is with Sphenura and its allies, and not with the preceding group. The bill is somewhat more produced and tapering, slenderer and less laterally compressed, than in Sphenura, with barely discernible emargination of the upper mandible, and the rictal bristles are smaller and more slightly curved; rest as in Sphenura, but the tail-feathers narrow and much graduated.

Ar. olivaceus, nobis. General aspect of Calamoherpe arundinacea (?), but at once distinguished by its shorter and thicker bill, and much more graduated tail-feathers. Length eight inches, of which the middle tail-feathers measure three and three-quarters, the outermost an inch less; wing three and one-eighth; and tarse an inch. Colour uniform olive-brown above, a little rufescent towards the tail; throat whitish, and the rest of the under-parts tinged with fulvous-brown; lores also pale: bill dark brown, the lower mandible pale carneous; and legs plumbeous. My impression is, that the sexes are equal in size, as are all the specimens before me,—unlike the sexes of Sphenura and Megalurus; but I have omitted to note down the fact.

Gampsorhynchus rufulus, nobis, J. A. S. XIII, 371. Four specimens of this curious bird are now before me, of which two are from Darjeeling, and the others from the mountains of Arracan: and it is remarkable that all of these appear to be partially affected with albinism. All four resemble in having the under-parts vivid white, with a tinge of ferruginous on the flanks; and the upper are bright olive-brown inclining to ferruginous, the tail-feathers tipped paler: all, too, have more or less white on the shoulder of the wing, though reduced to a single feather upon one wing only, of one of them, while another has about half an inch of the shoulder of each wing white, and the rest shew a greater or less admixture of white on the same part: but the crown varies most remarkably, being either pure white or bright ferruginous, or the two variously intermixed, and without either depending on age or season, as new feathers may be seen growing of both. In its affinities, this genus exhibits a very close approach to Sphenura, more so than I had recognised upon the examination of the first specimen only; but the more developed bill, and distinctly notched and hooked upper mandible, with the diminished curvature of the rictal bristles, which however are equally rigid, and longer and more tapering, fully authorise its separation from the form of Sphenura striata, though it is likely enough that species will eventually be found to connect them by intermediate links.

We have accordingly now the following Indian genera of this group:—Sphenura, Licht. (v. Dasyornis, Vig. and Horsf.);—Gampsorhynchus, nobis;—Arundinax, nobis;—Laticilla, nobis (olim Eurycercus, J. A. S. XIII, 374, which name cannot be retained, as it was previously applied to a genus of Entomostraca by Dr. W. Baird, in the An. and Mag. Nat. Hist., February, 1843, p. 88);—and Schænicola, nobis, XIII, 374: all these being distinct from the extra-Indian (so far as at present ascertained) Sphenæacus, Strickland, which again is closely allied\*: so also is Megalurus, Horsf. (vide XIII, 372); and we

<sup>\*</sup> If le Fluteur of Levaillant, which is the type of Mr. Strickland's Sphenæacus, be correctly figured by Mr. Swainson (who terms it Malurus africanus), it would have a much thicker bill than Sph. gramineus, Gould, figured in the "Birds of Australia," so much so that the two could scarcely range together in the same minimum group, though in other respects they would seem to resemble very closely. The Cinclorhamphus cruralis of Gould, founded on the Megalurus cruralis, Vig. and Horsf., is alform nearly allied to true Megalurus, and like the latter and also Sphenura, the female is very much smaller than the male, this disparity being even greater than in its Indian affines. I have never had an opportunity of observing the habits of Mega-

have the Malacocercus caudatus, (Dumeril, v. Timalia chatarrhæa, Franklin, and Megalurus isabellinus, Swainson), and the Suya criniger of Hodgson, connecting the present group respectively with the long-tailed Malacocerci, and with the Priniæ. Indeed, I hardly consider Suya to be separable from Prinia.

The genus Malacocercus treated of in XIII, 367 et seq., has since been further developed by Mr. Jerdon, in the second No. of his 'Illustrations of Indian Ornithology'; and this naturalist now considers that the species which he formerly referred to Somervillei of Sykes, and which I followed him in so doing in XIII, 368, is distinct from Col. Sykes's bird; for which reason he has given it the name malabaricus.

The proposed genus Orthorhinus, nobis, J. A. S. XIII, 371, proves to have been founded on a young example of a new species of Pomatorhinus, and must therefore be cancelled: but the species will stand as

Pomatorhinus hypoleucos, nobis. Adults, received from Tipperah and Arracan, merely differ from the young before described in the firmer texture of their feathers, and in the elongation and curvature of the beak, as in the other species of the genus to which it is now referred: but the beak is less curved and less compressedthan in the majority of the species, in which respect, as in size and colouring, P. erythrogenys makes the nearest approach to it. Colour above olive-brown, a little cinerascent on the head, and a rufous streak commences behind the eye and expands into a patch on the sides of the neck beyond the ear-coverts: lower-parts white, margined with ashy on the sides of the breast; and the flanks wholly ashy, with a tinge of brown: wings and tail a little rufescent, the fower tail-coverts more deeply so. Bill dusky, with more or less of its terminal portion horny-white; and the legs appear to have been greenish. Length ten to eleven inches, of wing four and a quarter, and tail four inches; bill to gape one and three-quarters; and tarse one and a half.

P. ferruginosus, nobis. This beautiful species measures about nine inches long, of which the tail is four and a quarter; wing three and a quarter; bill to forehead an inch to one and one-eighth; and tarse an inch and three-eighths. Colour greenish olive-brown above, the

lurus palustris, but am informed that it keeps much more to the reeds than seems to be the case with Cinclorhamphus australis, though it, in like manner, mounts singing into the air.

cap black in the male only; lores and ear-coverts also black in both sexes, extending a little along the sides of the neck; a long white supercilium, tinged with rufous on the sides of the forehead in the male; throat, towards the chin, also white, but the rest of the under-parts bright ferruginous, fading on the belly: bill deep coral-red; and legs dusky-brown. It is unusual, if not previously unexampled, for the sexes in this genus to present any marked difference of colouring. The species inhabits Darjeeling, and the mountains of Arracan.

Here, then, are two more species of *Pomatorhinus*, to be added to the ten (or eleven) enumerated in J. A. S. XIII, 946. I may remark, also, that specimens of P. schisticeps from Tipperah and Arracan have the rufous sides considerably brighter than any I have seen from the Himalaya, though this difference may, after all, be merely sexual; and that there seem to be two marked varieties of P. erythrogenys, one having white under-parts with merely faint traces of darker spots, the other with the throat and breast densely mottled with greenish-olive, much as in the darker specimens of P. ruficollis, though the latter species has always a white throat.

Genus Garrulax, Lesson. A more satisfactory reduction of the described species of this extensive genus may now be offered, than that given in Vol. XII, 948; but as there is no occasion for repeating here the synonymes which are there brought together, I shall merely put the word ante as a reference to them.

- 1. G. Belangeri, Lesson, ante. Tenasserim and Pegu.
- 2. G. leucolophos, (Gm.): probably Ianthocincla leucocephala, Gould, mentioned in P. Z. S. 1844, p. 92. Himalaya, Assam, Sylhet, and Arracan.
  - 3. G. perspicillatus, (Gmeltn), ante. China. (Non vidi.)
  - 4. G. chinensis, (Scopoli): G. auritus, &c., ante. China.
  - 5. G. albogularis, (Gould), ante. Himalaya.
  - 6. G. gularis, (McClelland). Assam. (Non vidi.)
  - 7. G. Delesserti, (Jerdon), ante. Neilgheries.
- 8. G. pectoralis, (Gould): var. G. melanotis, nobis, ante. Himalaya, Arracan. In the latter province, black-eared and silvery-eared individuals occur commonly in the same flock, with every intermediate grade; but I have only seen the silvery-eared variety from the Himalaya.
  - 9. G. moniliger, (Hodgson). Himalaya, Tipperah, Arracan.
  - 10. G. McClellandii, nobis, ante. Assam. (Non vidi.)

- 11. G. cœrulatus, (Hodgson). Himalaya : not rare at Darjeeling.
- 12. G. ruficollis, (Jardine and Selby): G. lunaris, (McClelland), ante. Darjeeling, Assam, Sylhet.
- 13. G. rufifrons, (Swainson), Menag. p. 290: G. rubrifrons, Lesson. Java. (Non vidi.)
  - 14. G. ocellatus, (Vigors). Himalaya.
  - 15. G. rufogularis, (Gould), ante. Himalaya, Sylhet ..
  - 16. G. squamatus, (Gould), ante. Himalaya.
- 17. G. subunicolor, (Hodgson). Young, described in J. A. S. XII, note to p. 952, and again in An. and Mag. N. H, May, 1845, p. 326. The adults are as follow: - Length ten inches, of which the tail measures four and a half, its outermost feathers an inch and a half less; of wing three inches and a half; bill to forehead five-eighths, and to gape seven-eighths; tarse an inch and three-eighths. Upper parts as in G. squamatus, but slightly greener, the feathers of the crown dashed with dusky-cinereous, and but very slightly margined darker; lores blackish; the ear-coverts and feathers immediately below them a little margined with silvery-ash: under-parts nearly resembling those above, but the breast and belly paler, with the dark margins to the feathers less intense: outer primaries and the emarginated portion of the rest narrowly edged with pale ash, the rest broadly with bright yellow, as in G. chrysopterus and some others: tail aureous olive-green where seen above, the remainder of the feathers blackish with narrow white tips: bill dusky, and legs brown. Common at Darjeeling.
  - 18. G. affinis, (Hodgson). Himalaya.
  - 19. G. chrysopterus, (Gould). Himalaya.
  - 20. G. erythrocephalus, (Vigors). . Himalaya.
  - 21. G. variegatus, (Vigors). Himfalaya.
- 22. G. phæniceus, (Gould), ante: probably erythropterus, Hodgson, mentioned in XII, 954, note. Himalaya.
  - 23. G. cachinnans, (Jerdon), ante. Neilgherries.
- 24. G. lineatus, (Vigors): Cinclosoma setiferum, Hodgson; probably C. striatum of Royle's list. Himalaya.
  - 25. G. imbricatus, nobis. Bootan.

Of the above list, twenty of the species are illustrated by mostly very fine specimens in the Society's museum: the desiderata are the Neilgherry G. Delesserti, the Assamese G. gularis and G. McClel-

landii, the Javanese G. rufifrons, and the Chinese G. perspicillatus, which last Mr. G. R. Gray identifies with G. Belangeri, though I suspect erroneously. In my former synopsis, are included also a G. Reinwardii and G. capistratus; but the former has proved to inhabit Senegal (vide Swainson's 'Birds of W. Africa', I, 276, Nat. Libr.), and the form of this species, which is the type of Crateropus, Sw., would appear intermediate to Garrulax v. Ianthocincla, and Malacocercus, Sw., so that Ianthocincla appears to have been erroneously identified by Mr. Swainson with his Crateropus, and the two groups are recognised separately by Mr. G. R. Gray;—and the latter species, or G. capistratus (Cinclosoma capistratum of Vigors,) proves also to be the Sibia nigriceps of Hodgson, the Hypsipetes gracilis of McClelland and Horsfield, and it is in all probability the Cinclosoma melanocephalum of Royle's list; wherefore it will now range as Sibia capistrata, (Vigors).

It may here be added, also, that Leiocincla plumosa, nobis, J. A. S. XII, 953, is the Actinodura Egertonii of Gould; and that Cinclosoma? nipalense, Hodgson, v. Sibia nipalensis, H., though allied to Actinodura, will not range therein (as has been suggested), but remain as the type of Ixops, Hodgson (XII, 958), connecting Actinodura with Sibia. Accordingly, the four supposed species of the latter genus enumerated in XII, 958, are now reduced to two, from the ejection of the first, and identification of the second and fourth; nor are the two species that remain very closely allied to each other.

The following is a Crateropodine genus, allied to Pellornium, and bearing some vague resemblance to the Malacopteron group.

Malacocinela, nobis. Bill as long as the head, rather stout, high, much compressed, the tip of the upper mandible pretty strongly hooked, but indistinctly emarginated, and its ridge obtusely angulated towards the base, the remainder scarcely angulated; gape but little widened, and feebly bristled; nostrils large and subovate, with oval aperture to the front, a little removed from the base of the bill: tarse of mean length and strength, as long as the middle toe with its claw; the claws suited for perching, compressed, and moderately curved, that of the hind toe rather large. Wings moderate, with the first primary reaching to about their middle, the second much shorter than the third, and the fourth longest: tail rather short, weak, and even, except that its outermost feathers are a little shorter than the rest.

Plumage full and lax, the coronal feathers somewhat elongated and of a spatulate form.

M. Abbotti, nobis. Length about six inches, or a trifle more; of wing three inches; and tail two and one-eighth: bill to gape not quite an inch, and tarse the same. Colour plain olive-brown above, tinged with rufous on the rump and tail, the upper tail-coverts ferruginous-brown: under-parts paler, the throat and middle of the belly white, the ear-coverts, sides of the breast, and flanks, rufescent, and the lower tail-coverts weak ferruginous. Bill chiefly pale horn coloured; and legs light brown. Discovered by our industrious contributor, Capt. Abbott, in the island of Ramree, Arracan; and since sent by Capt. Phayre from other parts of the same province.

Alcippe Phayrei, nobis. This genus is defined, and four species of it described and others indicated, in J. A. S. XIII, 384. The present one is most allied to A. poiocephala, (Jerdon,) and also to Siva nipalensis, Hodgson, of the Leiotrichane series: but is distinguished by its much less rufescent hue, especially on the tail and its upper and lower coverts, which are devoid of such a tinge, or the upper tailcoverts retain it only in a very slight degree. Length about five inches and a half, of wing two and three-quarters, and tail two and a half; bill to gape under three-quarters; and tarse seven-eighths of an inch. Upper-parts slightly fulvescent olive-brown, the crown ashy, and wings, particularly the large alars, margined with somewhat deeper fulvescent; lower-parts fulvescent-whitish, whitest on the throat and middle of the belly: bill dusky above, below pale; and legs light-coloured: outermost tail-feather five-sixteenths of an inch shorter than the middle ones. Inhabits Arracan, where discovered by Capt. Phayre.

In naming the two preceding species, I have merely rendered homage due to two gentlemen who have made great efforts to investigate the Natural History of the districts which have been placed under their administration. It is a kind of honour which is in the power of the naturalist to award; but it has been so much and so egregiously abused, that the distinction is no longer a very marked one, such as originally it was intended to be. The evil, however, it is to be hoped, is now working its own cure: and there is reason to believe that naturalists in general begin to feel the impropriety of underrating their

privilege of perpetuating the remembrance of the benefactors of their science, and especially of those who have contributed largely to the stock of materials from which information is derived;—a privilege which assuredly should be exercised charily, and with due judgment and discrimination; such as would really render it an honorable and coveted distinction, and be understood to serve for a lasting memorial and acknowledgment of services that had been done for science.

Iora, Horsfield. In J. A. S. XIII, 380-1, I indicated three described species of this genus, which had been erroneously considered identical; but at the time of writing that notice, I was acquainted only with the female of I. scapularis, which alone is figured and described by Dr. Horsfield. Both this and I. typhia are common in the vicinity of the Straits of Malacca-the male I. scapularis having the throat and fore-neck dark green, uniform with the upper parts, and no yellow except on the orbital feathers. According to Mr. Strickland, Dr. Horsfield has lately obtained a new Iora equal in size to the small Oriolus xanthonotus; and Mr. Strickland regards this approximation of size as tending to corroborate his opinion that the genus Iora is allied to Oriolus,-an opinion to which, however, with all deference, I do not feel disposed to accede. To the synonymes of I. zeylonica (which specific name was based on the Ceylon Blackcap of Brown's Illustrations,) must be added Muscicapa melanictera, Gm., founded on Brown's Yellowbreasted Flycatcher, also from Ceylon.

Chrysomma. Hodgson: founded upon Timalia hypoleuca, Franklin, v. T. Horsfieldi, Jardine and Selby. With reference to Mr. Frith's statement (J. A. S. XIII, 360,) of there being a second species of this form in Bengal, differing from the common one in being about half larger, I may remark that Chr. hypoleucos is subject to some variation of size, and especially of depth of colouring, more particularly upon the crown; some having this part dusky-vinaceous, with a tinge of the same on the rest of the upper parts, while others have the whole upper parts paler, and of an uniform rufescent-brown, brightest on the wings: the latter, however, appear to be younger birds, and certainly are not different in species from the dark-headed ones. Chr. hypoleucos appears to be very generally diffused throughout India.

August, 29th 1845.

( To be continued. )

A notice of the Alphabets of the Philippine Islands. Translated from the "Informe sobre el Estado de las Islas Filipinas," of Don Sinibaldo de Mas, Madrid January 1843. Vol. I. p. 25. By Henry Piddington, Sub-Secretary Asiatic Society, &c. &c. With a plate.

The Indians were not strangers to the art of reading and writing. I give (fig. 1. of the annexed plate) some Alphabets of different provinces which I have procured. It will be seen, at once, that they have all a common origin, or rather that they are one and the same. The little communication amongst these people for many years or ages, introduced alterations in their caligraphy as in their language, which was also probably at first but one stock.

Father Juan Francisco de San Antonio says, that they write like the Chinese, in perpendicular lines, and this error was copied by Father Martinez Zuniga, M. Le Gentil and others, who have written on the Philippines. Nevertheless, by documents which I have had in my possession, particularly from the archives of the convent of St. Augustin, in Manilla, I have ascertained that it is read from left to right, like our own. In fig. 2, is represented a fragment of a transfer of landed property, written in Bulacan in 1652, on Chinese writing paper:

And in fig. 3, two signatures with their equivalent renderings of the names, in our characters. To this same family of written characters would appear to belong (fig. 4) an inscription cut on a plank, which was found in 1837, by a detachment of Troops, in the mountains inhabited by the savage tribes called Igorrotes.

But withal, no books nor any kind of literature in this character are to be met with, except a few amatory verses written in a highly hyperbolical style, and hardly intelligible. It would appear, that their letters partook of this oriental redundancy. Register of Indian and Asiatic Earthquakes for the year 1843. By Lieutenant R. Baird Smith, F.G.S., Bengal Engineers.

- 1. Earthquake of the 2nd January, 1843.—This shock was experienced at Manilla, at a quarter-past one on the morning of the 2nd January. It consisted of two distinct vibrations with a very short interval between them, the first having a duration just perceptible, the second lasting nine seconds. I include in this Register all shocks in localities connected with the great Volcanic band of the Moluccas, because the northern extremity of this band is found in our own Territories, and the whole becomes thus connected with India Proper. The shock under notice appears to have been slight, but it was the forerunner of a series, one of which was of great violence.
- 2. Earthquake of the 4th January, 1843.—This earthquake occurred at Singapore, about midnight of the 4th, and on the same date and about the same hour two shocks were experienced at Malacca. My information relative to these shocks is very limited, being confined to a notice of their occurrence.
- 3. Earthquake of the 6th January, 1843.—The greatest force of the shock of the 6th January, so far as our information extends, was felt at Pulo Nias, in the vicinity of Java and Sumatra. For the following extract from the "Singapore Free Press," detailing the effects of the earthquake, I am indebted to H. Cope, Esq.

Singapore. Below will be found an account of an earthquake at Pulo Nias, translated from the "Java Courant," which we have received from our correspondent. It will be observed, that this earthquake occurred about the same time with the shocks which were experienced in Manilla, Singapore and Penang; but that it was of a much more violent nature, and attended with disastrous circumstances, which were happily unknown in other instances. In this case the phenomenon partook of all those fatal and violent effects which have usually been the accompaniments of similar convulsions of the earth in Java and Sumatra.

Account of an Earthquake at Pulo Nias. (Translation from the Java Courant, April 5th, 1843.)

Ignorant of the dismal scenes on which it would rise next morning, the sun set peaceably behind the Goenong (mountain) Sie Foli, (Island of Nias) on the evening of the 5th of January last.

1845.]

At 6 P.M. the Thermometer (Fahrenheit) marked 83°, the sky was clear, the sea calm, the air pleasant and mild, only a breeze from the Westward (a circumstance of rare occurrence in these parts) was felt.

The inhabitants of Nias, not aware of the fate that awaited them, were enjoying the repose of sleep, when at or about midnight they were roused by heavy shocks of the earth, which at first were felt in a slight degree from the wind shifting to the Northward, but became every moment more violent; so that no fixed direction could be given to them, the shocks subsiding into a complete trembling of the earth, so that at every instant it was expected the whole Island would disappear.

The shocks continued without intermission during nine minutes, the ground was moved up and down, like the rocking of a swing; to stand up or to walk was alike impossible; houses were destroyed, burying beneath their ruins the ill-fated inhabitants.

A portion of the Mount Horiffa, close to Goenong Sie Foli, together with the fortifications of the Benting and the other Government buildings, with the exception of the barracks and Commandant's house, were totally destroyed; Coco and other large trees which for upwards of a century had withstood the hand of Time, were torn up by the roots, and the ground divided itself, shewing deep yawning chasms from which trickled a blackish frothy liquid.

No subterraneous noises were heard, being probably drowned by the dreadful din of falling mountains, houses and trees, joined to the thril-

ling shouts of the population.

About nine minutes passed in the fear of immediate destruction, the inhabitants began gradually to recover from the trance in which they lay plunged by this sudden calamity, people appearing from beneath the ruins of a house, or from an abyss into which they had been plunged; the one to save an aged mother, the other his helpless child.

The dreadful scene was lit up by the most beautiful sky and sparkling stars. Not long the unfortunate Islanders were permitted to exult in the hope of their miraculous escape. Again, the earth began to tremble, and repeated shocks were felt with new force. Suddenly a tremendous wave rose from the South-East, and with awful noise, spreading itself over that part of the Coast, bore every thing before it, sweeping away men, women, cattle, houses, and even whole villages;



so that in a single moment, the same spot where cattle were grazing, had become the abode of fishes.

The large Campong Mego, about one Dutch mile, South of Goenong Sie Foli, was entirely washed away by the wave; and many days afterwards the dead bodies of the victims of this woeful destruction might be seen on the beach.

The same wave penetrated into the neighbourhood of Goenong Sie Foli with such violence, that the prows lying in the river were thrown upon the shore, 100 or 160 paces from their anchorage; among the number was the Government Cruising Schooner, No. 23. The new Bazar, consisting of wooden houses, and situated on the left side of the river, was also entirely washed away. The inhabitants who escaped fled to the Benting, 60 or 100 feet above the sea, to implore the succour of others as miserable as themselves.

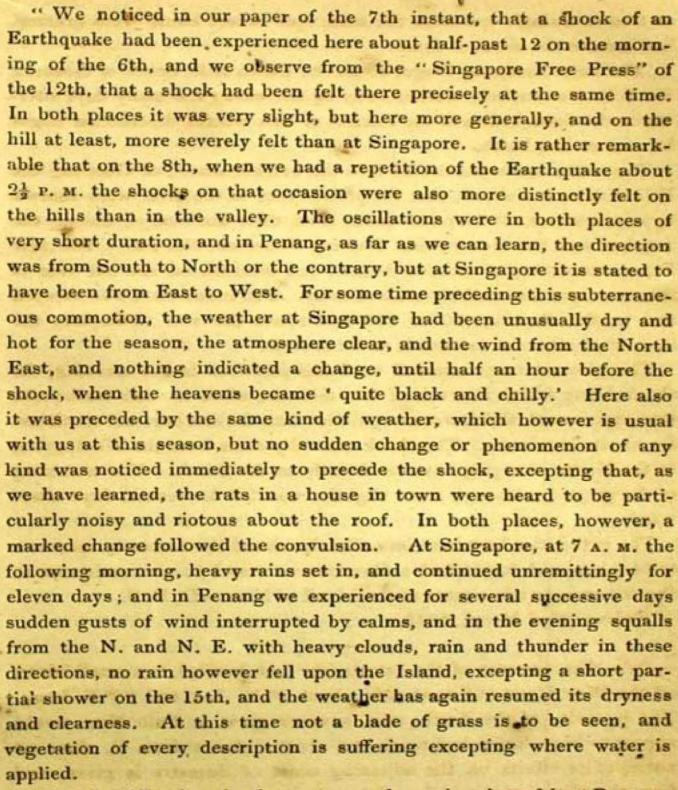
This phenomenon continued until half-past four in the morning, the shock being felt at intervals of two minutes, when another earthquake was experienced, which was more violent than the first one, and continued for about six minutes. The shock generally came from the West, going to the North, changing however directly to the South. The trembling of the ground, although more slightly, was felt for several days afterwards.

The authorities here have immediately caused the necessary measures to be taken, and despatched a Government vessel to give assistance to the unfortunate inhabitants of the island of Nias.—D. F. S.

Padang, 23rd March, 1843.

Pulo Nias, the seat of the catastrophe just detailed, is a small island off the West Coast of Sumatra, in about 2° N. Lat. and 98° E. Long. The intensity of the Earthquake, however great in Pulo Nias, would appear to have diminished much at a short distance from it, since no notice of its effects on the adjoining coast of Sumatra is given, and from the silence of the writer of the above account, we are led to infer that the shock if felt at all at Padang, was there very slight.

Pursuing a North Easterly direction, this same Earthquake was experienced at Singapore and Penang. The following extract from the "Penang Gazette," details the effects of the shock at these two places.

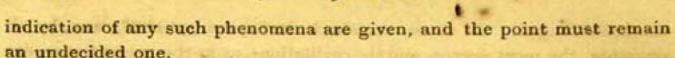


"Shocks of Earthquakes have on several occasions been felt at Penang; within the last ten years we have had four different shocks, and with the exception of the last, they have always happened during the latter months of the year. The first took place in November 1833, the second in August 1835, the third in September 1837, and the fourth on the 6th instant, as above stated. It appears therefore that here they occur periodically, and that the last interval has been more than double



the usual length. Of these, the shock in September 1837, was, by all accounts, the most severe, and the oscillations, as in the present case, are said to have come from South to North, and to have lasted full a minute and a half. It is said that on that occasion, several herds of cattle in the neighbourhood were observed running in the utmost confusion in all directions, that lamp and picture-frames oscillated, that the Roman Catholic Church bell rang of its own accord, that quantities of large shot piled up in the Fort were thrown down and scattered about, that a stone wall of a substantial building in town was rent, and the whole inhabitants were thrown into a state of consternation. The shipping in the harbour did not experience this shock, nor did the sea appear agitated; five days subsequently however another smart shock was felt, and was followed by a very heavy squall from the N. W. and great agitation and rise of the sea in the harbour. The tide overflowed the Northern beach, and flooded the compounds and lower rooms of the houses in the neighbourhood. The convulsion was experienced at the same time at Achen and along the Pedier Coast, and it is said that these places sustained considerable damage. By the late shock a clock in town was stopped, and some felt a dizziness in the head and a sensation like sea-sickness, but we have not heard of any other phenomenon attending this Earthquake. It may be that neither this shock nor any of the previous ones we have noticed are to be supposed the effects of convulsions taking place immediately below us, but to have been transmitted from some neighbouring region within the range of Earthquakes, such as Sumatra. The recent one may be described as having been a mere tremor of the ground, more than a shock."-Penang Gazette, 28th January, 1843.

From the facts now detailed, it appears, that the point of greatest intensity of the chock of the 6th January 1843, was in the immediate vicinity of, if not directly beneath, the island of Pulo Nias. The south coast of the island suffered most, since it was upon it that the destructive wave first broke. The facts stated are not sufficient to warrant any conclusion as to the cause of this great wave; it may have arisen from violent volcanic action in the adjoining bed of the sea, or it may have been the reflux of a wave generated by the sudden upheavement of the coast of the island itself. In both cases it is probable, the sea would first have receded from, and then returned in force upon the coast, and in the latter part of the upheavement would have remained, but no



The general direction of the shock was from South-West to North-East; from the relative geographical positions of Pulo Nias and Singapore, the direction in the latter island would be from West to East, just the contrary to that specified in the extract above given; in Penang, on the other hand, the course would be from South to North, as correctly stated by the writer in the "Penang Gazette."

Indications of atmospheric disturbance accompanied the shock at Singapore and Penang, and most probably at Pulo Nias also, although it is not so stated in the published notices. At Singapore, nearer to the focus of the shock, these disturbances were greater than at Penang, and it is a fact to be noted, that at the former place, very heavy rain immediately followed the convulsion.

- 4. Earthquake of the 8th January, 1843.—This shock, which was very slight, was experienced at Penang, about midnight of the 8th January. It was not accompanied by any phenomena requiring special record, and was the last of the series which in the early part of the month of January were experienced throughout the Eastern islands.
- 5. Earthquake of the 8th February, 1843.—This shock was experienced at Ahmedabad in Goojerat, at 2 A.M. on the 8th February. The direction was from N. E. to S. W., and four distinct vibrations of the earth were observed, the entire duration being about eight minutes. Before the shocks were felt, there was a great rumbling noise as if carts or carriages were passing by.

These shocks were evidently of slight intensity and limited range, there being no notices of their having been experienced elsewhere than in the neighbourhood of Ahmedabad. So far as inference may be made from their direction, they would seem to have emanated from the tract of the Vindayas.

The early part of the month of February 1843, was remarkable for other indications of volcanic activity. On the 6th, one of the small volcanic hills on the Arracan coast, near to the station of Kyouk Phyoo, exhibited a sudden eruption; some particulars of which are given in the following extract from a letter to the address of H. Piddington, Esq., kindly forwarded to me by that gentleman.



## " Kyouk Phyoo, 7th February, 1843.

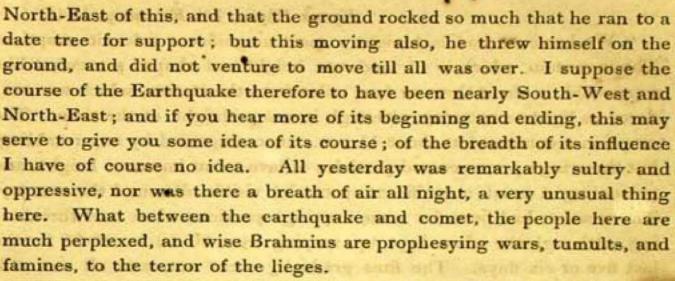
"We however had last night a most magnificent volcanic eruption. The mountain, which is of moderate height and shaped somewhat like a pyramid, is about three or four miles from the station, which was rendered as light as noonday, although it was midnight at the time. The eruption commenced at about 11 p.m., unaccompanied by any rumbling, but throwing up masses and particles of lava to an immense height, and presenting a most magnificent spectacle, visible all cound the country. The weather had been for some evenings previous, close and threatening, although the glass kept up, varying from 30-12 to 29-98 for the last five or six days. The fires gradually went out, and all was still gain by about half an hour after midnight. This eruption takes place from what I hear, generally once in two years, sometimes annually."

6. Earthquake of the 1st April, 1843.—The Earthquake of the 1st April 1843, was experienced in the Deccan; I shall trace its course so far as the materials available permit, from North to South.

The most northerly point at which the shock was experienced was Sholapore; (Lat. 17°40' North and Long. 76° 3' East) the effects of the Earthquake at this place are detailed in the following extract from the "Bombay Times."

"The following extract from a letter, dated Sholapore, 1st April 1843, gives an account of an Earthquake which seems to have visited the Deccan.

"I was suddenly awakened this morning about half-past 4, by a loud rumbling noise very like thunder, only more continuous and monotonous; and while speculating on what the possible cause could be, my bed began to shake in a very unequivocal manner, so as to leave no doubt of an Earthquake; the noise apparently came from the South or South-West, preceding the shock and lasting about two minutes, and the shock, which though slightly felt in a tent, was more severely apparent in houses, and continued, I should think, about two seconds, perhaps hardly so much. I hear however, that in the town at the foot of the hill of Sholapore, the shock was much more severe, that the ground rocked considerably, and plaster fell from the roofs and walls of the houses causing infinite alarm to the people, such an event never having occurred here before within the memory of any one. One of my Tappal (post) runners informs me, that the noise and shock met him about six miles



"An old gentleman who has just called, informs me, there was an Earthquake here, the year Tippoo was disposed of! I have no means of ascertaining the truth of this; but is this country in the track of any volcanic current or influence? Certainly Earthquakes are not common occurrences."

The next place from which we have a notice of the shock, is Mucktul (Lat. 16° 43' N. Long. 77° 35' East). This notice is contained in the following extract from the "Madras Spectator" of the 26th April, 1843.

"A correspondent at Mucktul has favoured us with the following notice of the shock of an Earthquake felt there, as at Bellary and Sholapore on the 1st of this month. We apprehended with our correspondent, that the maximum intensity of the shock passed through Bellary in a line parallel to the direction of the Western Ghauts, its violence subsiding further Eastward, as at Mucktul.

"The Earthquake was felt here very distinctly on the morning of the 1st about a quarter to 5 o'clock. The undulating motion was not sufficiently perceptible to enable one to judge of the direction of the shock; here was merely a slight tremulous motion accompanied by a rumbling noise similar to that of a carriage passing a drawbridge. I suspect from your remark in your paper of the 12th instant, that its maximum point of intensity was at Bellary, or between this and Bellary. At Singsoorgoor and Shorapore, both places nearer Bellary than this is, it was felt much stronger than here; but at Hydrabad, about one hundred miles from this station, I suspect there was no shock, otherwise I should have heard; Bellary is also about one hundred miles from Mucktul. The morning of the 1st was here also excessively hot and close."

and still."

Our next notice of the shock is from Bellary (Lat. 15° 5' N. Long. 76° 59' East), where the following phenomena were observed, and are detailed in the "Madras Spectator:"-" We are indebted to a friend at Bellary for notice of the shock of an Earthquake which was felt there on the 1st instant, at about a quarter before 5. That morning a rumbling noise was heard described as resembling the well known sound (to railway travellers) of blowing off the steam from the engine. The sound increased in loudness to that of a moderate peal of thunder, and with it an undulating motion was felt, which increased in intensity till the whole cantonment shook. 'My bed,' says the writer, 'trembled till I felt almost giddy; the sound then decreased, and with it the agitation subsided.' The direction of the shock appeared to be from South-East to North-West, the atmosphere seems to have sympathised with this subterranean disturbance, the previous night having been a very stormy one, and at 4 on Saturday morning it suddenly became oppressively hot

I am indebted to H. Piddington, Esq. for the following interesting notice by Captain Newbold, Madras Army, of the effects of the shock of the 1st April 1843, at Kurnool. This notice ought to have preceded that from Bellary, but it was accidentally omitted.

" Kurnool, 23rd February, 1844.

"Observing from the pages of your Journal that some researches are being instituted into the phenomena of Earthquakes, the following extract from my memoranda of an Earthquake that was felt here last year, may add to the recorded data on this head.

"Kurnool, Long. 78° 7' Lat. N. 15° 50': approximate height above the sea 900 feet. April 1st 1843, about 5 A.M. awakened by the shock of an Earthquake, accompanied by a subterranean noise like that of the rumble of Artillery at a distance. It lasted only some seconds; the noise appeared to come from the North-East, and died away to the S. W. It appears to have been felt at Bellary, which is about seventy-three miles direct distance W. S. W. from Kurnool, about the same time. There was nothing particular in the state of the weather. The comet which I first observed here on the 4th of the preceding month, was then visible, and its advent had been accompanied by a sudden and unusual rise of the Tumbuddra, which had swept off the numerous native gardens in its bed, a catastrophe which both the Affghans and Hindoos of this



place concurred in attributing to the inauspicious influence of the 'Tailed Star.'

"Some of the older natives of this part of India assure me, that Earthquakes usually happen in the hot season. East of this in the Jemaconda district, separated from Kurnool by a high chain of the Eastern Ghauts, slight shocks of Earthquakes are more frequent than in other parts of South India. This district is situated on the plutonic, hypogene, and basaltic rocks which form a platform between the trap of the Deccan—the largest known continuous sheet of ancient lava in the world—and the great active volcanic band that runs Southerly down the Bay of Bengal, crosses the Equator by Sumatra into the Eastern Archipelago, thence Easterly embracing Flores, Java, and Timor, and the whole chain of the islands to New Guinea: whence the main trunk proceeds Northerly by the Moluccas and Philippine Islands, terminating to the North in the Peninsula of Alaska, in about the 59th degree of longitude.

"Kurnool is situate about 76 miles in a direct line W. by S. from Jemaconda, on the great line of drainage of this part of India, at the confluence of the Tumbuddra and the Hendri, on the limestone associated with the diamond sandstone, which here overlie the plutonic rocks previously alluded to; the latter constitute the base of the whole of Southern India, and are seen outcropping immediately in the vicinity of Kurnool.

"The most Southerly point to which the shock under notice would appear to have reached, is Hurryhur, Lat. 14° 30' N. Long. 75° 59' East. The following is the account of the shock as felt at that place. April 2nd. A slight shock of an Earthquake was felt here a little after 4 o'clock yesterday morning, attended by a dull noise, as if it were the rolling of a carriage at a distance.

"It was predicted the day previous by the Bramins, that a phenomenon resembling a blazing man with a sword in his hand would be observed the same night in the heavens, and numerous have been the spectators anxiously expecting its appearance the greater part of the night; but for all their trouble (although many were up till 4 A. M.) they were disappointed.

"The weather previous to the above shock had been exceedingly warm, but since we have had a few showers of rain, and it is now cooler."

From the preceding details, the ascertained limits of the shock of the 1st April are Sholapore on the North and West, Kurnool on the East,



and Hurryhur on the South. The intensity would appear to have been greater at the intermediate point, Bellary, than at any other, leading to the inference that this place was nearer to the focus of the shock than the other stations at which observations were made. The general direction of the shock was evidently parallel to that of the Western Ghauts, namely from South-West to North-East. A peculiar state of the atmosphere was observed at four of the five stations where the shock was felt; an oppressive closeness of the air and great heat preceded the shock, and after it passed, a change was experienced at Hurryhur by rain.

Earthquake of the 6th April, 1843.—This shock was experienced in various parts of Assam. The following extracts give details:

Extract from the "Friend of India:"—" A letter from Sibsagur, dated April 7th, says, a very singular meteoric appearance was observed here a few evenings since. It occurred a little before 9 o'clock on the evening of the 4th; a very brilliant light suddenly illuminated the whole atmosphere, and on looking up a large cluster of falling stars was seen rapidly descending towards the East in an oblique direction. These disappeared in a few seconds, and about a minute afterwards a loud report was heard resembling that of cannon, resulting doubtless from explosion of the luminous mass. The report was also heard at Jaipore. Last evening at half-past 8, we had several very severe shocks of an Earthquake; the vibration's lasted for about five minutes. Another slight shock was felt at a quarter-past 1 o'clock this morning."

The following extract from Captain Hannay's Journal, kindly communicated to me by Mr. Piddington, gives an account of the shocks as experienced at Debrooghur:—"After a very hot day and close sultry evening, a severe shock of an Earthquake at Debrooghur, lasted several minutes. The motion, however, was only trembling; affecting those houses which had posts built up by walls. Direction appeared to be from W. to S. W.

"April 7th.—Slight shocks at Debrooghur at midnight. Both these Earthquakes felt at Sibsagur, Jeypore, and all over Upper Assam."

At Jeypore the shock is thus described, under date 7th April:

"Last night, nine or ten minutes past 8, we felt a smart shock of an Earthquake, and in four or five minutes more, another shock more severe than the first, and which lasted, I should think, full two minutes. The



doors and windows rattled at a great rate, and one of our lads, who was standing on the bank of the river at the time, said he was near being thrown into the stream: it was the most severe shock I ever felt in Assam. Its course appeared to be from East to West; some of the residents think there were three shocks, but I only noticed two. The weather has been unusually warm for the last two or three days.—

Hurkaru Paper.

8. Earthquake of the 11th April, 1843.—This shock was felt very smartly at Landour, and occurred about five minutes past 8 A.M. The doors and windows of the houses shook and rattled loudly. From observations made on the undulations of liquid in a cup, the direction was from North to South, or from the interior of the hills towards the plains; the duration of the shock was estimated at thirty seconds.

The same shock was experienced about the same time at Hurdwar and Meerut, at both places being very slight, and unaccompanied by any circumstances worthy of note.

9. Earthquake of the 12th May, 1843.—The following is an account of this shock as experienced at Penang, taken from the "Penang Gazette" of May 13th:—"Yesterday about 1 P.M. an Earthquake was felt here; the motion was very distinct, it was like a succession of waves, and very different from the quick vibration of the shock experienced in January last: after the first two or three waves a slight pause, when it continued, the undulation being greater; persons sitting were moved from side to side or backwards and forwards in their chairs in a direction from West to East, or from N. W. to S. E., and hanging lamps were swayed to and fro in the same line. It lasted five or six seconds. It came in the direction of Sumatra."

We have no account of this shock from any other point than Penang.

10. Earthquake of the 3rd of June, 1843.—This shock was also of very limited range and slight intensity; the only place where it would seem to have been felt being Titalayah, at the base of the Sikkim hills, on the road to Darjeeling. The following extracts from the "Hurkaru" newspaper furnish details.

"By a letter, which we have just received from Titalayah, it appears that that place was visited by an Earthquake on the morning of the 3rd instant. A smart shock of an Earthquake was felt here this morning; I could not note the precise time, not having any time-piece, but I think it was about 10 o'clock. It appeared to pass from North



to South-West, and lasted about three seconds, accompanied with a rumbling noise, like distant thunder.

"The weather for the last three days has been very sultry, with great masses of heavy dark clouds in the North: but this morning about 7 o'clock a thunder-storm passed from North to South-East, with heavy rain, continuing for upwards of two hours; it was perfectly calm at the time of the shock, but the wind rose immediately afterwards, blowing in sudden and heavy gusts from the North-East, with distant thunder from the Westward.

"No damage has been done that I am aware of, but the natives were much alarmed; some, who were at work on the road before my house, threw down their tools and ran away."—Bengal Hurkaru, 10th June.

11. 12. 13. Earthquakes of the 15th, 16th and 17th June, 1843.—
This series of shocks was experienced in Assam. The first, that of the 15th, is thus noted in Captain Hannay's Register—" At 11 A.M. a smart shock of an Earthquake, with a vertical motion."

The second, that of the 16th, is thus described in a letter from Jeypur:

"On the 16th, fifteen minutes past 8 p.m. we felt the most severe shock of an Earthquake I have noticed in Assam; we had a slight shock the day previous at noon." Mr. Masters, in a list of Earthquakes felt in Assam, forwarded to me by Major Jenkins, the Commissioner, to whom I am indebted for many similar acts of kindness, thus notices the same shock—"At 8h. 45m. p.m. a smart shock at —."

The last of the series is described in Captain Hannay's Register in the following terms:—"June 17th, 8 r.m. a very smart shock; at first slight and followed by a severe one, motion undulating, and from the position of a clock which was stopped, must have come from S. W. or W. It lasted altogether about a minute; the weather rainy, with occasional light squalls from S. W. These shocks were felt at Delava, Jaipur, and Sacherah; that of this date at a few minutes past 8, reported by the Officer at Sacherah to have thrown down a portion of the bank of the Burrumpooter."

14. Earthquake of the 17th June, 1843.—This shock is of interest, as being the only instance of an Earthquake in Ceylon of which any notice has been obtained; reference is made in one of the extracts that follow to a shock in 1823, that affected this Island, and these two cases are all that have as yet been found on record.

The following extract from the "Colombo Observer" of the 19th



June, details the effects of the shock as experienced at Colombo:—"On Saturday morning, at about half-past 12, a slight shock of an Earthquake, which lasted half a minute, was felt at Colombo.

"Persons who happened not to have gone to bed felt the ground to tremble, and heard furniture and even roofs of houses to crack. Many amusing anecdotes are told of those who were awoke by the shock; some supposing tricks were being played upon them, others that robbers were in their houses, and several that people were under their beds."

The "Ceylon Herald" of the 20th, gives the following particulars:

"On Friday night, the 17th, at about half-past 12, Colombo and its vicinity were visited by an Earthquake, the most terrific of all natural phenomena. It was however so slight, that many people were not at all aware of it, and what was worse, they would hardly believe it when they were informed.

"Three distinct shocks were felt at very short intervals, all three not perhaps so long as a minute; great numbers were aware of two shocks, and all agree that the last was the smallest. Most people having retired for the night, they were awakened by their beds being moved upwards in a most remarkable manner, while the curtains moved backwards and forwards, doors and windows shook, and occasionally a creak was heard from the rafters and crockery in the godowns; but although fears were entertained that injury was done to the houses, not a single instance of the kind has been brought under notice.

"The officer on guard felt the guard-room vibrate; and in another quarter of Colombo a gentleman writes, that his whole house moved the same as a ship when struck by a heavy sea.

"From Galle we learn, that it was felt there at the same time, and with no greater force. As yet we have heard nothing of its being felt in the Central Province. It is very rarely that Earthquakes happen either in Ceylon or Southern India; we have heard of one in 1823, which at Hambantotte caused the glass on the sideboard to jingle, and it was pretty generally felt throughout the Island.

"It frequently happens, that an extraordinary fall of the Barometer is observed to precede an Earthquake, but we have not heard yet whether this symptom of its approach was noticed here or not; such a fall of the Barometer lately attracted considerable attention on the Coast, in connexion with the late storms, and it will be curious to know whether it



was observed on this occasion. Not long after the Earthquake, we had one of those violent squalls which have been so frequent of late as to pass almost without observation; but we have been assured by some of the oldest residents here, that for many years past there have not been such violent storms of wind and rain. As if the electricity in the earth and atmosphere, or whatever else causes storms and Earthquakes, were exhausted, we have had since Saturday a sudden transition to settled weather, with every appearance of its lasting for some time."

With the exception of its locality, there is nothing requiring note in this shock.

15. Earthquake of the 10th August, 1843.—Two notices of this shock has reached me; one from A. Campbell, Esq. at Darjeeling, the other from E. Ravenshaw, Esq. at Patna. Dr. Campbell writes as follows, under date 11th August, 1843.

"At 15 minutes to 5 r. m. yesterday, 10th August, by my watch, which was 15 minutes fast by sundial time, we had a shock of Earthquake here, which lasted 20 seconds. Its course was N. W. by S. E. The motion was horizontal: no damage done to any thing.

"As you have expressed a wish to be furnished with information regarding Earthquakes, I have the pleasure to inform you, that a slight shock was experienced at Patna on the 10th instant, at about 4½ P. M. A letter from Tirhoot (Muzufferpoor) mentions, that it was also felt there on the same date and about the same hour."

In a very interesting letter, under date the 9th September 1843, Mr. Ravenshaw communicates the following information:—" A few days after I wrote to you about the Earthquake of the 10th August, my Sheristadar told me he had heard springs of water (Bumbås) had suddenly made their appearance in several villages of the district. I immediately told him to send a man to the spot to bring me some of the water, and all the particulars he could collect regarding the date of their appearance; their number, site, &c. The man returned with seven bottles of the water, and a note in Persian from a person on the spot, stating seven Bumbås had appeared at Dostmahommedpoor, Purgunnah Azemabad, about twenty miles East of Patna. Of these two were large and flowing rapidly, and five small; about a koss West of the village there were seven or eight more, of which three were constantly flowing, the others smaller and less active. He said that others had been heard of at Moza Tilwur, Purgunnah Bhum-



poor, and at Jugutpoor Chedee, Purgunnah Gyaspoor, to the Eastward of Dostmahommedpoor. Another native told me he had heard of a similar occurrence at Moza Scojava, near Jehanabad, half way between this and Agra; some of them are said to be hot springs. I tasted some of the water with oxylate of ammonia, and it proved to be strongly impregnated with lime, like all the water of this district. The Persian letter reported that the Bumbâs made their appearance, or rather were first observed, on the 13th Sawun, or Monday 24th July, which is 16 days before the Earthquake; but I think this must be a mistake, as they were not mentioned to me until several days after I had written to you: it is possible however there may have been another Earthquake, which was not felt at Patna. At any rate I have thought it right to send you this information, which, if not useful, may be interesting.

"Any connection between the appearance of these Springs and the Earthquake is doubtful, the evidence being against, rather than in favour, of such connection; at the same time the occurrence is rare and interesting, and deserves to be recorded, although its causes are too obscure to be traced satisfactorily.

16. 17. Earthquake of the 3rd September, 1843 .- These shocks were felt in Assam, and are recorded by Captain Hannay, in whose memorandum the following remarks occur under the above date :-- " After a hot and sultry day (the 2nd) as ever I felt, the clouds gathered to the South-West, indicating rain, but passed off without any; night very close and sultry: awoke by a smart shock of an Earthquake, cannot speak as to direction." Again, under the same date, at 71 P. M. it is remarked, "After a very hot day clouds gathered at S. E., very close and sultry. Squall came on a little before sunset; vivid lightning all round the heavens: previous to squall breaking heard an extraordinary noise in the heavens overhead, like the falling of heavy rain on distant jungle, or like the rushing of wind through a funnel : with the noise was heard an occasional growl, like distant thunder. When the rain fell, this noise had continued for some time, thunder very high in the heaven, but the lightning one blaze all round; whilst at dinner a smart shock from the South." This latter shock is interesting, from being preceded by the peculiar noise in the air, and accompanied by an excessive display of electricity in the atmosphere. Both shocks, in common indeed with all experienced in Assam, were slight in intensity.



18. Earthquake of the 30th October, 1843.—This Earthquake occurred at Sandoway in Arracan, and is thus described under date 31st October 1843, by a correspondent of the "Englishman:"—"Yesterday morning, at a quarter to 8 o'clock, this place was visited with a severe concussion of an Earthquake, which continued about two minutes; the oscillations appeared to take a North and Southerly direction, no injury was done, and the general face of the surrounding country remains unaltered: the morning was exceedingly fine, and the Thermometer at 75°. I have written to friends at all stations North of this, to ascertain whether the shock was felt at those places, and have also got natives to write to their friends, in the hills and towards Bassein, to learn whether it was felt in these directions, and if it presented any uncommon phenomenon."

At a subsequent date, the same writer adds the following particulars:—"Having promised you the results of my enquiries connected with the Earthquake which was felt here on the 30th October last, and with the volcanic eruption which took place some time ago off that Island, near Cheduba, I have now the pleasure to forward you all the information I have been able to collect on the subject, premising, however, that being totally unacquainted with the science of geology, many minutiæ have doubtless escaped my enquiry, which would have attracted the attention of a scientific man.

"Regarding the Earthquake, it appears to have proceeded from the South, extending itself along the line of coast as far North as the Town of Ramree, at which place it was but slightly felt; and still fainter at Kyook Phyoo, which is situated at the North of Ramree Island. The shock was very perceptible at Cheduba, scarcely at all so in the Yoomadong mountains, but very severe at 'Gookhcomg,' which is about ninety miles South of this, and on the sea shore. The Soogree (or head man) of that district, with whom I have fortunately had an interview, describes it as having so agitated the place, as to cause a great rustling in the trees, and loose stones to roll down the hills; but he states he has neither seen nor heard of its having been attended with any remarkable incident. It has in all probability been felt in Moulmein, and if you have not already had some information on the subject from thence, it would perhaps be a point worth ascertaining.\*



"With reference to the Volcano, which left a transient Island formation, it took place in July last, and continued in an igneous state for eight days. The water in the wells on Flat Island rose considerably, and no noise or agitation preceded the eruption, or was experienced during the period of its action. The native from whom I gained my information, describes it as having been a most magnificent sight, particularly at night; flaming forth with fierceness, as to cause the columns of smoke to ascend till lost in the heavens. The Island which is mentioned as having been thrown up out of the sea, and subsequently disappeared, could have been nothing more than an accumulation of ashes, cinders and lava, ultimately removed by the influence of the tide, and the severity of the South-West monsoon. The situation of it appears to have been a little South of Flat Island, in the intersection of two lines, one drawn through the two volcanoes in Cheduba, and the other through the volcano near Kyook Phyoo and Flat Island; this leads one to the supposition, that it might have some relation to the two former volcanoes. I have seen a number of geological specimens, which were subsequently brought from Flat Island, among which I could recognise quartz, limestone, iron pyrites, shale and scoriæ, besides some others of an igneous nature, the minerological composition of which I could not ascertain."

19. Earthquake of the 14th November, 1843.—The following extract of a letter, under date the 25th November 1843, from Major Jenkins, gives an account of a shock on the 14th November, as felt in parts of Assam:—"This is just to mention, that a smart shock of an Earthquake was felt at Gowhattee and through Kamroop on the morning of the 14th instant, about from 1 to 3 o'clock; it was so severe as to awaken all the gentlemen out of their beds.

"I did not feel it in my boat, nor did any of the gentlemen at Sibsagur (Rungpoore) feel it. Mr. Masters now with me, among others,

neither felt it, nor heard that the natives had perceived it."

As far as Assam is concerned, it has been partial it would seem, as no intelligence of this shock having been experienced elsewhere than above stated having reached me, Major Jenkins's reference as to its local character is probably correct.

20. Earthquake of the 18th December, 1843.—This shock was also confined, so far as collected intelligence would shew, to lower Assam. The following extract of a letter from Captain Butler to Major Jenkins,

kindly forwarded to me by the latter, gives details:—" Gowhattee, 19th December 1843. Yesterday whilst sitting in Court, at twenty minutes past 4 P. M. we felt a very severe Earthquake, with a rumbling noise from South to North: the motion was very great, and had it continued a moment longer, I was prepared to rush out of the building. These Earthquakes appear to becoming more violent than I ever recollect before in Assam, from what cause I cannot imagine; but a little more would bring down our Courts and large Bungalows." Major Jenkins mentions, that this shock was not felt in Upper Assam, nor is there any reason to believe it was felt towards Sylhet and Bengal; so that, if the Earthquakes are really becoming more severe, they would appear still to preserve their strictly local and limited character.

This concludes the Register for 1843, shewing a total of twenty shocks during the year, of varying intensity and character. I refrain at present from attempting any detailed arrangement of the phenomena they present, as this can best be done when a large number of observations come under discussion. I now, in closing this paper, will merely annex a Summary of its contents in a Tabular Form.

Tabular Summary of Indian and Asiatic Earthquakes for the year 1843.

Number.	Date.	Locality aff. ted.	Remarks.
1	January 2d.	Manilla,	Slight.
2	ALL DESCRIPTIONS OF THE PROPERTY OF THE PROPER	Singapore,	Slight. [Singapore, &c.
3	The state of the s	Pulo Nias,	Very severe, extended to Penang,
4	A STATE OF THE PARTY OF THE PAR	Penang,	Slight.
5		Ahmedabad,	Slight. [&c.
6	April 1st,	The Deccan,	Severe, felt at Sholapore, Belgaum,
7	,, 6th,	Assam,	Smart.
1	,, 11th,	Himalayas,	Smart, extended to the Plains.
9	May 12th,	Penang,	Smart.
10	June 3d,	Titalayah,	Slight.
11	" lāth,	Assam,	Smart.
12	" 16th,	Ditto,	Severe.
13	" 17th, .	Ditto,	Smart.
14	17th,	Ceylon,	Smart.
15	A. 10th,.	Darjeeling,	Slight, extended to Patna, &c.
16	Sept. 3d,	Assam,	
17		The state of the s	Ditto.
18		Arracan,	Smart.
19	The second secon	asam,	Slight.
20	Dec. 18th,	Ditto,	Smart.

## JOURNAL

OF THE

## ASIATIC SOCIETY.

On the Buddhist Emblem of Architecture. By Capt. T. LATTER, B. N. I.,
Assistant Commissioner, Arracan. With two plates.

MY DEAR SIR,—I do myself the pleasure of forwarding, for the inspection of the Asiatic Society of Calcutta, the accompanying portions of a Boodhist Sculpture, (fig. 1.) brought by me from the old town of Arracan; and as they present some peculiarities, I have no doubt that the following remarks will be acceptable.

They formed the upper part of a figure, one of which was sculptured on each side of the entrance into the court of a sort of small cave temple; and they are interesting on account of the Rose which surmounts the figure, and which is identical with the Rosette of Architecture. It was the only one of such emblems, to which I could not at once apply a Boodhistical interpretation; and the discovery of this one in a position that could not admit of a doubt of its meaning, and that meaning exactly in conformity with what I expected it would have been, was a source of much pleasure to me.

I will then now proceed to give you a Boodhistical view of the emblems of masonry, and I do so with some hesitation at the risk of being accused of riding my hobby, "jusqu' à l'outrance;" as I am aware that my remarks are of a speculative character: still, as they are the only attempt that has been made, as far as I am aware, at explaining these architectural emblems on philosophical grounds, they may be both interesting, and the means of drawing the attention of others to similar subjects.

TOTAL LIGHT

In the following pages I shall confine myself to the explication of those emblematic ornaments which occur in the Doric order, that "first-born of Architecture," because, being the most antient, its emblems are of the most pure and simple type, and have none of those confused and meretricious additions which we find abounding in the later orders, as the Corinthian and Composite.

I have already had occasion\* to remark, that I considered Boodhism to have been a metaphysical system emanating from an Egyptian fountain; that it was introduced at a very early period into Hindustan; that it there became influenced by local circumstances, as also probably by fresh importations from the original source. Boodhism appears, thus, not only to have acquired various local types, but likewise, after being so altered, to have diffused itself, as it were, from new centres of motion, and thus to have given rise by mutual interferences, to varied and mixed results. We find this illustrated in the history of modern Boodhism, (that of Gaudama). We read of its being imported, from a certain source, into regions where it was previously unknown; of its dying away from negligence, or persecution, in its early strongholds; of its again drawing fresh life from its young offshoots; and thus, finally. presenting in its original seat, a phase modified by the provincialisms, with which it had been imbued. This is the case with the Boodhism of Ceylon; which was imported into trans-Gangetic India, became afterwards nearly extinct, and was revived by fresh supplies from Siam, I, in the same paper, endeavoured to trace the mental process by which Boodhism progressed into heathenism; viewing it in fact, as the incipient stage of what is usually styled Idolatry; leading naturally into the degrading cult of Fetichism. I also pointed out how that Boodhism, in its early, and comparatively pure state, (influenced by that craving after substantiality inherent in human nature) endeavoured to realise its ideas, first by numbers, next by symbols consisting of numerical combinations, and finally, by employing living animals, and their representations as types. Considering Boodhism then as I did, as emanating from an Egyptian source, I naturally was led into comparing it with those systems which were acknowledged to have had such an origin, and especially with those which delighted in expressing

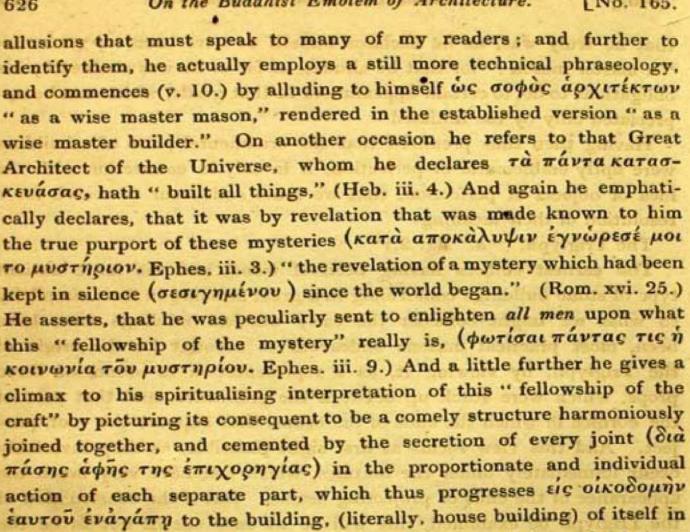
<sup>\*</sup> Vide " Note on Boodhism," published in McClelland's Journal.



themselves by symbols, and representations. We know that those antient mysteries, a lineal descendant of which has come down to the present day, obeyed this description; they were Egyptian in origin, and were symbolic, and emblematic in predilection. It was in these mysteries in which was locked up the craft of Architecture; and it is on the results of that science that we are likely to find impressed the appearances we have alluded to.

The emblematic ornaments then, to which I would draw your attentin, are the Triglyph, the Dentals, the Bull's or Ox's skull, and the Patera or Rosette. And before entering upon them I must premise that, if we were to view a building with the eyes of that craft, to whom through a long line of ages was consecrated their structure, and their charge, the ornamental parts would aptly be emblematic of "perfection." Or to use the phraseology of the speculatists, having reared up a mental structure complete in all its parts, and comely in all its proportions, we proceed to add to it those ornaments, and to enrich it with those gifts, which, though not necessary to its usefulness, add to its grace and beauty. It would be needless for me to go through the pages of antient authors to illustrate this point, but we find it abundantly instanced in the writings of Paul, who deeply conversant with those mysteries himself, not only continually endeavoured to point out their hidden purport, but likewise was anxious to connect them with the high spiritualism of the new faith he had embraced. Thus he declares, that Jesus Christ is the "chief corner-stone," (Ephes. ii. 20,) "the true foundation," (1 Corinth. iii. 11.) He then tells his hearers to build upon this foundation, and he reminds them that "every man's work shall be made manifest; (φανερον γενήσεται, " shall become publicly known,") for the day shall declare it (δηλώσει, shall expose it); that it must stand the test of fire, before the workman (μισθον λήψεται,) shall take his wages; and he curiously adds, that if however "any man's work shall be burned," (i. e. not be able to stand the test of fire) ζημιωθησεται " he shall be fined," \* but he himself shall be saved, yet so as by fire." (Ib. v. 13. et seq.) All these are technical

<sup>\*</sup> This is the most correct and literal rendering of this word, for it is the 3rd person singular ("he") 1st future indicative ("shall") passive voice "be") of the verb of nµ10, which in this voice can only make sense, by having accorded to it its general acceptation of "mulct, punishment by fine."



I shall have again occasion to revert to this portion of my subject, and place beyond a doubt not only the intimate acquaintance that Paul had with these mysteries, but likewise shew that his writings prove

Love. (Ephes. iv. 16.) Thus closing with the watch-word of those

mysteries to which he referred.\*

<sup>\*</sup> What I have advanced here is simply thus: that not only was Paul initiated into those antient and secret mysteries, which were associations of brotherhood; but that he wanted to point out that their inculcations of fellowship and love, and of the performance of high morality were in themselves insufficient; that they required the vivifying Grace of that Being, whose faith he had adopted, and that this mental edifice required to be built up, not upon one's own foundation, but upon the foundation, and in the spirit of Him, whose Apostle he was. Thus he declares, that the true view of these mysteries had not till then been pointed out. Indeed the whole circumstance is one of many instances exemplifying Paul's transcendent qualities as a Pleader; wherever he may be, whoever he may be addressing, he invariably seizes upon some existing peculiarity, some belief identified with local predilections, on which to fix the consecutive glories of the magnificent cause he was advocating; and thus disarming suspicion, and unopposed by prejudices in the outset, he proceeds in one train of powerful induction, to enunciate the startling truths of which he was possessed.

CENTRAL LEGARY

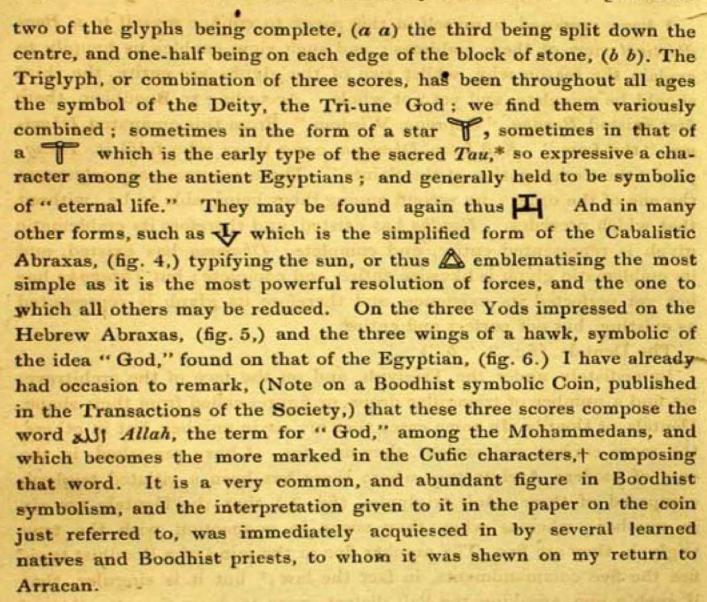
that he truly was, as he declares himself to have been, αρχιτέκτων "a master mason;" for that he alludes, as far as he was enabled by his obligations to do, to certain appearances in that grade, which can be appreciated only by the initiated.

Having then thus premised that the ornamental parts of a building were aptly emblematic of perfection, it is only in connection with the idea of objects of perfection, that we must endeavour to search for a resolution of their meaning.

The Triglyph, (" a." fig. 2.)

The earliest edifices having been of wood, and the more antient type of stone buildings conforming in a great measure in their simplicity to what we might consider the early wooden buildings must have been, most practical masons endeavour to account for the origin of the Triglyph, by viewing it, as a representation in stone, of three props, which were stuck up between the architrave, and that part of the cornice in which the ends of the beams that support the roof, project. And this view seems at first sight plausible, as they invariably occur immediately under the mutules, which last have very much the appearance of the ends of projecting beams. But if the construction of the Triglyph be examined, this will be at once shewn not to be the case; independent of which it is much more probable that the primitive builders put a solid oblong block, to support this most important part of the edifice, instead of leaving it to the strength of three slim sticks, or bits of planks. In fact, it was a solid block which, from the important functions it had to perform, viz. to support in the first instance the whole weight of the roof, and in the second to keep it clear of the architrave, was happily impressed with the most sacred of all emblems, in all ages, among all nations, the Twiglyph.

This quadrangular block was the prototype of that hewn and "cubic stone," which plays so important a role, in modern masonry. It was, according to Duteil, emblematic of legal, as the unhewn stone was of natural, justice; and was consequently employed in early ages as the seat of judges, and is, he says, the  $\xi \epsilon \sigma \tau \circ \zeta \lambda \iota \theta \circ \zeta$  placed by Homer, in the third Odyssey, before the portals of Nestor. It is likewise an emblem found on Boodhist coins, and has by some been taken for an altar. It will be remarked by examining the Triglyph of Architecture (fig. 3,) that it is so constructed as to leave no dispute of its meaning;



<sup>\*</sup> Vide some remarks on this character by the Author, "Introduction to Grammar of the Language of Burmah," p. xxxix.

<sup>#</sup> In those characters ווא the final s is shewn to be a member of the word, and to be radical, the same as in its Hebrew analogue alahim, in which last the plurality of the root is evident. Thus in the plural number it is the word used for "God," in many parts of the Bible; and throughout the first chapter of Genesis, especially verse 26. מוֹנוֹל בְּעִוֹל בְּעִוֹל בִּעִוֹל אַנֹי וֹל בְעִיל בְעִיל בְעִיל בְּעִיל בְעִיל בְעִיל בְּעִיל בְעִיל בְעִיל בְּעִיל בְעיל בְּעִיל בְּעִיל בְּעִיל בְּעִיל בְּעִיל בְּעִיל בְּעִיל בְּעִיל בְּעִיל בְעִיל בְעיל בְעי



I have proposed to myself in this paper to confine myself to a Boodhistical view of these emblems; and such view enables us happily to explain the reason why, whilst two of the glyphs are entire, the third should be complete, and yet not whole. According to Boodhism, there first existed Boodha, "Supreme Wisdom." From this emanated Dhamma, "the Law." And from Dhamma, come those who fulfil it, Thenggha, "the Congregation of the Saints." These are necessary sequences the one of the other; no second among them being able to be, without that which precedes. Boodha has existed, and therefore its emblematic glyph is represented entire, and complete; Dhamma has existed, and its emblematic glyph is likewise entire, and complete; but Thenggha has not yet perfected its existence, and therefore its glyph is represented as existing, but not perfect and entire.

The Dentals, (fig. 2. " b.")

Immediately under the Triglyph, and on the face of the architrave, we find a number of triangular drops, or figures called from their shape, Dentals, or Dentils. In some cases they are six in number, but in others, the more correct and antient, they are five. I have remarked, in the case of modern Architecture where there has been a vitiated triglyph composed of three whole triglyphs, (fig. 7.) that the Dentals are six in number; whereas when they occur in connection with the true triglyph, they are five. The number five in the mind of a Boodhist typifies the five commandments, in fact the law;\* but it is singular, that if such a one, speaking the Pali dialect, were to draw the attention of another person to these Dentals, he would employ the term pěgnytsěng, (pronounced something like peentseng) to identify them; and this is the technical term employed to express the five commandments.† This

\* Conf. Grammar of Burmese Language, p. 90.

† As it bears upon the typical value of the number "five," I have inserted the following portion of a note published in the work already alluded to "the name of the number five" (pegnytsa.) in the Pali language is composed of pegnya, which implies "wisdom, understanding;" the final tsa, is an expletive in very common use in the Pali language. It has been shewn (p. 90) that, in the eye of the modern Boodhist, the number 5 typifies the five commandments, in fact the law. It will be self-evident to the intelligent mind, how naturally that the fulfilment of the law was identified with "wisdom," and "understanding." Examples might be multiplied to show that it was so in the minds of the early races of mankind: "Behold, the fear of the Lord, that is wisdom; and to depart from evil, that is understanding." (Job. xxviii, 28.) "Give me understanding, and I shall keep thy law; yea, I shall observe it with my

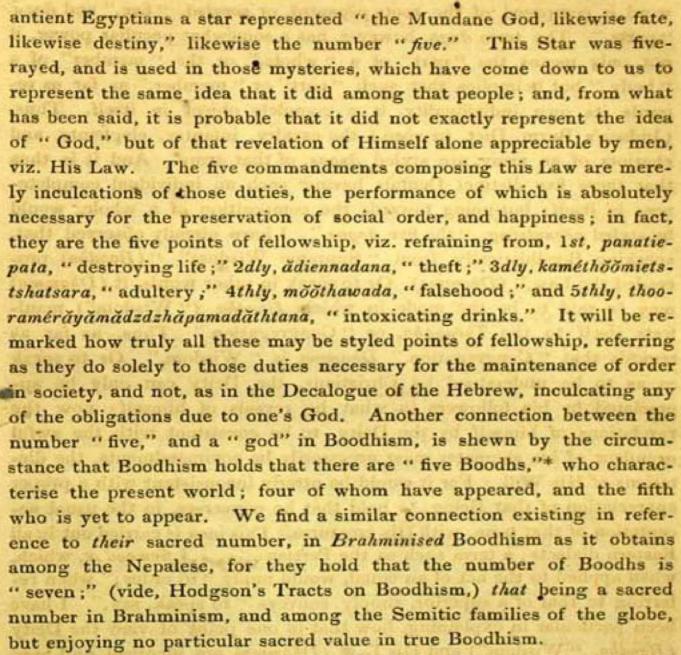


word is composed of the roots pegnytsa, or peentsa, "five," and anga, "parts." The term anga, however, has a somewhat peculiar power, it not only means the "part" of a "whole," or the "member" of a "body;" but it implies that such "part" or "member," as far as regards its own individuality, is a complete object in itself. (Judson's Burm. Dict. in voce.) the cavalry, infantry, elephants, and chariots of an army, are styled angas, of that army. And it is thus that these five distinct Dentals having each an individual completeness in itself; but going towards the composition of a whole, would be styled pegnytseng. "the five angas." I have already observed that, speaking Boodhistically, from "Supreme Wisdom" "(Boodha) proceeded the Law," (Dhamma). Or to speak in other words, it (Dhamma) may be said to be the mode in which Boodha ("Wisdom") manifests itself to the Thenggha, or "Congregation." Thus, as far as regards that "Congregation," Dhamma is "Wisdom." Or to speak so as to be understood by Christians, the Deity can only be appreciated by his followers in what he reveals of himself; now the revelations of himself by the Deity, to be consistent with the awful grandeur of his character must necessarily be commandments, the dictations of His Will. For it would be utterly inconsistent with a proper appreciation of that Being, to hold that he converses, in the usual acceptation of that term, with His creatures. This idea is carried out in all Eastern dialects; a term such as the Persian ¿firmoodun, which, when applied to the act of an equal, would imply "to order;" when referring to that of a superior, simply conveys "to speak, say." I have been particular in explaining, how that in one point of view the Deity (Boodha, "Wisdom") and His Law (Dhamma) are identical, and have mentioned that this Dhamma is typified by the number "five;" for thus is explained how the Pali name of that number (pegnytsa) is deducible from pegnya, "wisdom;" and it may guide us to the understanding of Hor Apollo, where he says (Lib. I. c. 13.) that among the

whole heart." (Ps. cxix. 34.) The same connection between "knowledge, wisdom, and understanding," and the precepts of the law, exist in the Burmese language.

The pure Burman term for these five commandments is Social thiedeng, which

implies "news, information;" and is composed of the root & thie, " to know, perceive, understand," and & teng. (with, or without the points) " to contain, hold, &c." Introduction to Grammar of Burmese Language, p. xi.



Having thus discussed the Triglyph and Dentals, we will proceed to those ornaments which are generally placed on the metopes of the frieze. These generally are the head of a dead Bull, or Ox; or a Rose, or Rosette, generally styled a "Patera." I have already remarked, that it is only in connection with the idea of perfectibility that we must endeavour to realize the symbolism of these emblematic ornaments. We have already seen how that Boodhistically viewed, the Triglyph emblematises the union of Boodha, Dhamma, Thěnggha; forming when

<sup>\*</sup> A Boodh, comes nearest among them to the definition of a God, being the sole true object of worship.



united the Thărănăgŏŏn, "the Supreme and decisive attributes." It is thus that in the Burmese (a Boodhistical) language, when the term thŏŏn, "three," is applied in an attributive signification to a person, in fact if it be said, "so, and so threes," it implies that he performs those moral duties and obligations, that make him a member of the Thěnggha, that "Congregation" who fulfil the "Law," thus making himself one of the Three. I have also endeavoured to shew how that viewed in a similar light, the Dentals would admirably represent Dhamma. And now I proceed to point out how that the Ox's, or Bull's skull, and the Rose, in the same way, represent the numbers of the Thěnggha.

We will recapitulate that the earliest symbols by which Boodhism endeavoured to represent her ideas were numbers. This we have shewn by the attributive signification of certain numbers in Boodhistical languages, which only can be accounted for by their allusions to certain tenets of the Boodhist faith. For instance, if it was held that such and such, or so many components, or qualities, existed in the various individualities of the physical and metaphysical world, then the name of that number necessarily conveyed the idea of, and typified them. The next step was materialising into tangibility these numerical types; this was done by the corresponding number of marks or scores. This class of symbols appears to have been more used for the illustration of those higher objects and ideas, which did not pertain to mankind, and his converse here below. Soon, however, certain objects of the animal creation were chosen, on account of certain peculiarities in their temper, conformation, or mode of existence, to represent cognate ideas, especially in connection with the correspondent qualities among mankind. Thus, there are three grades in the Thenggha. 1st, the Boodhithatwa; 2ndly, the Pratyeka Boodhas; 3rdly, the Thrawaka. The first was typified by an Ox, the second by a Deer, and the third by a Sheep. (Conf. Travels of Four Kor Ki, by A. Remusat, p. 10.) The first then is the one to which we must look for the interpretation of this Ox's or Bull's skull,\* which we find forming an ornament of these friezes, (fig. 2. "c.") I am aware, that it has been generally attempted by practical masons to explain the presence of this skull, by holding it to

This mode of representation by synecdoche is very abundant in hieroglyphic, and emblematic sculptury; the head being employed as an abbreviation of the whole animal: thus we say, so many "head of cattle."

refer to the sacrifice of bulls and oxen; but then in that case, it would have been the representation of the head of a live animal. Duteil considers, that the circumstance of its being the head of a dead animal, (referring to the instance of the representation being that of dead Ram's head,) alludes to the destruction of the world by fire, when by the precession of the equinoxes the sun shall again lead the opening year in the constellation of Aries. (Dict. des Hierog.) Dupuis likewise (Origine de tous les Cultes,) declares the worship of the Bull originated at the period when that luminary opened the year in Taurus. Indeed he considers that all the various religious myths referred to the sun. That Hercules in his twelve labours was the sun in his twelve zodiacal signs: that Jason in search of the fleece of Colchis, was a mythological allusion to the god of day entering Aries; he supports the accusation, brought by its early opponents, that Christianity was a species of Mithraism, and declares that the birth of Christ was nothing but a spiritualism of the sun in Virgo. Without disputing these positions, we have still to account how this animal was held in such high veneration, as to have had accorded to it, with others, this stellar apotheosis, necessary to have enabled their version of the myth to have had an origin. We see how Boodhism explains this by having employed them as types, and the animal under discussion, as the representative of the highest moral perfection that humanity is capable of; and I shall proceed to show how perfectly in keeping it was that the crowning point of this perfection should be held to be " DEATH."

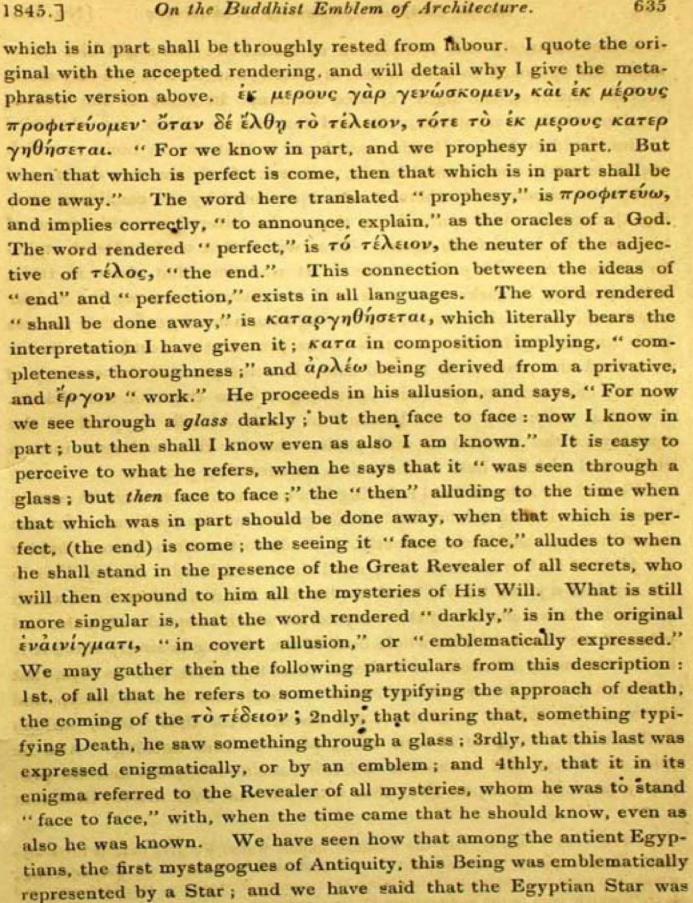
It is the Boodhithatwa "the perfector of wisdom," who alone is able directly to attain Niebhan, "the not to be," without having to undergo any more transmigrations. It is for this state of annihilation that every Boodhist pines; and it can be attained but by death alone. In all those mysteries which were held in such high veneration by the Antients, and the types of which have descended in a chain of unbroken succession even to our own days, the attainment of the crowning point of the craft was typical of Death. It was alone by passing through the vale of its shadow that perfect light could be obtained. Apuleius, in the eleventh book of his Metamorphosis, or Fable of the Golden Ass,

<sup>.</sup> It is singular to remark how rapidly this mistaken idea was adopted by the Greeks; for we find very often the friezes of the Corinthian order occupied by a long sacrificial procession.

describes minutely this completion of initiation: the night-like darkness; the approach to the confines of Death; and then in the very midst of this darkness, the light revealed to him? In some of the various versions of these mysteries, it is said that the candidate was shrouded in the shudder-cloth of Death, was placed in that narrow home to which we all must go, was raised again, and went forth the new-born, and perfect craftsman. In others, it was represented by the candidate passing through an oval, symbolising that as he entered into this scene of woe, so must he go forth again. Thus was it that we find Death styled in antient writ "the portal of life." It was thus that clefts in trees, and openings in rocks were ever held in veneration among the vulgar of all nations; passing one's body through them is a regenerating process gone through by Hindoo devotees in the present time, and even in our own land the practice it is said exists in some parts of the country of passing children through such openings to cure them of the rickets. A similar ceremony is the bathing in those khonds, (typical of the opening of the womb,) or still pools, where a river enlarges into a circle, and which is held in India as a regenerating process.

We find the Apostle Paul referring in a most marked manner to certain appearances in the celebration of this grade, and he too yearns for the time when he shall know perfectly. I allude to the often-quoted chapter the 13th of 1st Corinthians. The word there translated "charity,"\* is in the original  $a\gamma a\pi \eta$  "love," and implies that bond of brotherhood which ever was the watchword of those mysteries which he speaks of in the 2nd verse of the chapter. The whole bent of the chapter is singly this; it is one of the many allusions he makes to these mysteries, and he says, that although he may be ever so well read in them, and be able to expound them ever so clearly, yet if he is not imbued with that "love," which is the foundation-stone of them all, it profiteth him nothing. And he goes on to say, that in this life we can but know in part, and we prophesy (announce) in part; but that when the end shall arrive, then that

<sup>\*</sup> The word "charity," in the confined import which we give to it, is little else than ελεημοσύνη "alms-giving;" but it is derived from the Greek χαρις-ιτος, which is a most expressive root, implying that union of "mercy, thankfulness, and love," which goes to the composition of that exquisite quality "grace;" a quality which, whilst it is an attribute characteristic of a God, is still to be discerned in the tracery of a leaf.



invariably five-rayed.

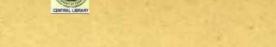
On the Buddhist Emblem of Architecture.

I have thus, I trust, sufficiently explained why this Bull's or Ox's skull, typical in Boodhism of the highest grade, the Boodhithatwa, is represented as pertaining to Death; that end being itself most essentially necessary to the fulfilment of perfection.

Rose, or Rosette.

We now come to the last of these emblems, which I propose to discuss; viz. the Rose-shaped Ornament often found occupying, like the preceding, the metopes of friezes. This ornament is, I believe, generally styled a "Patera," by practical architects, and is held to be a representation of the dish which was employed in the presentation of offerings among the Antients; but it must be a singular sort of a dish to have the petals and stamens of a Rose. It is met with under variously altered forms, sometimes presenting a type so vitiated, as to have lost almost all its floral characteristics; but it is much more similar to a Rose, than is the so-called Rose Ornament of the Corinthian Abacus, which we shall have occasion to discuss more fully. In the case of modern buildings, where, on account of their public character, attention has been paid to their details, I have observed that this ornament has preserved, if I may use the expression, its botany; whereas in private, or carelessly executed edifices, it is difficult at times to recognise it. It is found alternating with a sort of lily-formed flower at the base of the Doric capital immediately above the Astragal.

Considering it then, as I did from the very first, as a Rose; it was as I have remarked in the commencement of this paper, the only one of these ornaments to which I could not immediately apply a Boodhistical interpretation. Still, as Boodhism was so fond of recording her ideas in symbols, and as she was by no means restricted in her choice to the animal kingdom, and as this emblem, from its occupying the position of others importing "supremacy and perfection," must necessarily have had a kindred power; it appeared to me in fullest keeping, that the Rose should be there, as the most appropriate deputy from the floral regions of Creation, the fittest representative "after its kind" of such high qualities. It was therefore with no small delight that I found this regal flower occupying a place in Boodhist sculptury, which left no ambiguity to its meaning; and in a position identical with that in which it is often found in modern Architecture, viz. on each side, and



towards the upper angle of a porch, or gateway. This signification, then, which I have thus accorded to the Rose, of typifying "supremacy and perfection, chiefdom and eminence," is one that must find a confirmation in every intelligent mind. There is a curious passage in the second book of the "Erotics" of Achilles Tatius, describing the loves of Clitophon and Leucippe, which happily supports my viewsεί τοις ἄνθεσιν ήθελεν ὁ Ζεὺς ἐπιθείναι βασιλέα, τὸ ρόδον αν των ανθέων έβαδίλευε. γης έστι κόσμος, φυτών αγλάϊσμα, όφθαλμὸς ἀνθέων, λειμῶνος ἐρύθημα, κάλλος ἀστράπτον. ἔρωτος πνέει, Α φροδιτην προξενεί, εὐειδέσι φύλλοις κομά, εὐκινήτοις πετάλοις τουφά. τὸ πέταλον τω ζεφύρω γελά. " If Jove were desirous of placing a lord over the parterre, surely the Rose would king it among flowers. It is the ornament of the earth, the beauty of plants, the beloved (literally, the eye) of flowers, the blush of the meadow, dazzling in its loveliness. It breathes Love, it invites Venus, it is tressed in beautiful leaves; it luxuriates midst the trembling foliage, and its petals laugh in the zephyr."

I have already remarked, that this Rose (fig. 1. "a.") (which it will be particularly noticed is meant for a wild or dog Rose) was found in a position that left no doubt of its being typical of supremacy; for it is placed (characteristically) over the head of a figure holding the umbrella, an insignia of royalty and supremacy, among all nations under the sun, (or more correctly perhaps in proportion as they were under sun) and crowned likewise with the tiara of chiefdom, the prototype of that which we find adorning the head of images of Siva, and of which a representative has descended to the present day, and is used in theatrical performances in Burmah and Arracan, as the head covering of kings and princes. Thus the whole figure may be read, 1st, from the insignia in its possession to have been a royal personage; 2ndly, to have been a Boodhithatwa, from the Rose typical of that grade being placed characteristically over its head. It is thus I consider it to be meant for a representation of Gaudama when he was on this earth, but previous to his being imbued with the Boodhic spell. This mode of placing an object over a figure to characterise it, is found abundantly in antient Sculptury. Thus we see the five-rayed



Star of Destiny, of which we have spoken so often, placed over the head of a figure, (fig. 8.) representing that Deity. The Rosette likewise forms an expressive ornament of the most important portion of the clothing, in fact of the badge of the modern mysteries.

A circumstance to be noticed in this figure is, that the ears are represented with the lobes pierced, and filled with small cylinders, by which the bottom of the ear is brought nearly as low as the shoulder. This is a peculiarity that exists in all Boodhist figures throughout India, and is a fashion that still prevails in India beyond the Ganges, and in those mountainous ranges where Braminism has never obtained. It is most probable that this custom was adopted from the traditionary belief, that the ears of Gaudama were so formed; for we find it recorded of that god in Boodhist scriptures, that his stature was eighteen cubits; and that the lobes of his ears rested upon his shoulders. This mode therefore of piercing, and loading to distention, the lobes of the ears, appears to have been adopted in remembrance of that divinity, and to have deserted the plains of Hindostan, and to have taken refuge in farther lands, and inaccessible recesses together with that worship of which it was one of the accompaniments.

Before bringing my communication to a close, I must refer to one other architectural ornament, a portion of which is found as a very abundant symbol on Boodhist coins; I allude to the so-called Rose Ornament on the Corinthian Abacus, (fig. 9). There, however, can be no mistaking the flower to be a representation of the Helianthus, or sun-flower, which appears in this instance to have been employed to symbolise the Sun; for from it proceeds a vivifying ray which terminates in a triple head.\* This flame-shaped symbol, but without the triple head, is found on Boodhist coins, (fig. 10). No definite meaning has been given to it. Marsden declares it not to be the representation of a "flame," but of the conch sacred to Vishnu; but Boodhism holds nothing of that god. Its character however is sufficiently determined, from the circumstance of its being found in identically the same form

<sup>•</sup> It is singular that this might almost express the amount of the knowledge, which moderns have arrived at of the components of the Solar ray being three; the illuminating ray, the heating ray, and the chemical ray. It is not, I believe, yet satisfactorily settled whether there is not a magnetic ray. The other three are, however, acknowledged.

on the hieroglyphic sculptures of Egypt; sometimes by itself, sometimes rising from a sort of lamp, or cresset, (fig. 11). Champollion mistook it for a "tear" (PSIX €), and therefore consigned to it, in his phonitic system, the power of an "R."

There is another symbol of frequent occurrence on Boodhist coins, especially on the one which you did me the favour of submitting to my inspection, and of which a description and explanation has appeared in the Journal of the Society. I give a representation of that side of the coin on which that symbol occurs, (fig. 12). In the paper alluded to, I declared that to a person acquainted with Boodhist cosmology, there could not be the slightest doubt, but that the whole of that side of the coin was intended as a symbolic representation of former universes in general, and of this universe in particular. And I moreover declared, that although I could not give any definite interpretation to the symbol occupying the centre, shewn detached at fig. 13; yet that from its relative position, and granting that my interpretation of the rest was correct; there was no doubt in my own mind that it was meant to represent this world in particular. I am glad to be able to say, that the whole of my views in reference to that coin, have since met with the valuable acquiescence of a friend, (Captain Phayre, Assistant Commissioner of Arracan,) who is not only deeply read in Boodhist literature, but has likewise an extensive collection of these coins. It is singular, however, that the following simple interpretation of that symbol, should not have occurred to me at the moment. We know that among the cabalists, as well as among others whose systems originated in the same source, the triangle with its apex upwards typified "fire," as did that with its apex downwards, "water." In the antient system of ideographic representation, when an object was represented repeated more than once, it signified "plurality, reiteration," in reference to that object. Now the two sets composing this figure are so represented, with their points meeting in a circle, (the universe), having a point within it (this globe); thus symbolising the reiterated effects of fire and water upon this mundane universe; which agrees exactly with Boodhist cosmology; for according to it this world has continually been alternately destroyed by fire and water; whence its-Pali name lăngă, from lăŭ, " reiteration, to be again and again."

Yours faithfully and truly,

THOS. LATTER.



P. S.—Since writing the above—on shewing my explication of the side of the coin above referred to, and especially of the central emblem, to an intelligent Boodhist priest, he was much delighted with, and acquiesced in, it. On being asked what he had hitherto considered the central emblem to have referred to, he replied; " to the Rajpaleng, or throne, on which Gaudama was impregnated with the Boodhic spell." On being pressed for his reasons, he said, "because it bore a resemblance to that species of foot-stool, called a drum Morah!". It is thus, that a somewhat similar shaped figure has been so employed in the pictorial representations of the life of Gaudama. With reference to the Rose-shaped Ornament discussed, I may be accused of a botanical inaccuracy, as the number of petals in the species Rosa arvensis, and Rosa canima, are " five;" whereas that of those in the representation on the sculpture are "eight;" but to this I attach but little importance: 1st, because the whole appertains to a rude, and inaccurate age; and 2ndly, because it is peculiarly the genius of the Burmese language to style, and consider as a Rose, any rosi-form flower. With reference to the Dentals: they appertain, I believe, principally to the Ionic order, and are of rarer occurrence in the Doric. In the secluded locality from which I write, I have no means, in order to determine their proper number, of consulting any standard works on the subject; but in the case of modern buildings of a public character, I do not remember to have met with any other number than "five." I may as well mention, that the present is not the only instance in which the Rose forms an ornament in Boodhist architecture; they were found in abundance in various other Boodhist cave temples, which I visited in old Arracan Town. I was likewise informed by a friend, who had visited most of the cave temples of Western India, that the Rose is found alternating with a horse-shoe device, and with a tiger's head; and others, as ornaments on the friezes of those reliques.



Notes, chiefly Geological, across the Peninsula from Mangalore, in Lat.

N. 12° 49', by the Bisly Pass to Madras, in Lat. N. 13° 4'. By

Captain Newbold, F. R. S., M. N. I., Assistant Commissioner,

Kurnool.

Mangalore, the civil and military head-quarters of South Canara, and a seaport of considerable traffic, stands on the Malabar, or Western coast of India, in Lat. 12° 49′ N., Long. 75° 0′ E.

It is situated on a sort of peninsula or tongue of land between two rivers, which unite in its front in an extensive backwater, or lagoon, almost shut out from the sea by a long narrow bank of sand. There was formerly a deep opening on this sandbank by which ships could enter the sheltered waters of the lagoon after being lightened of their cargo; but its depth has been considerably lessened by the formation of another opening. The Coast patamars and Arabian buggalas can still pass into the lagoon with safety.

The rivers are navigable for country boats nearly to the foot of the ghauts, and form advantageous channels of commercial communication with the interior. The principal exports are to Surat, Bombay, the ports on the Malabar Coast and Arabia, and consist chiefly of rice, betel-nuts, pepper, cardamoms, cassia, sandal-wood, turmeric, and salt-fish. The chief imports are cloths from Bombay, Surat, Madras, Bellary, Bangalore, and Cuddapah.

The higher parts of the peninsula present a thick bed of laterite, intersected by small flat-bottomed vallies opening out towards the sea, and flanked by steep hills of laterite. The summits of these hills are usually flat, like those of trap or sandstone, with steeply sloping sides and occasionally precipitous cliffs. In structure the laterite is porous, and sometimes cavernous. Dr. Herklots, in his Account of Mahomedan Customs, describes the sacred shrines of Shaikh Fureed at Cuddry, about two miles from Mangalore, as being situated in a cave in a centre of a perpendicular rock composed of laterite which is said to lead all the way to Hydrabad, 450 miles! The extent, which cannot be very great, has not yet been ascertained.

Arcola, or Feringhipett. From Mangalore by Cuddry Devasthanum, and Koonoor to Arcola, about nine miles, the road lies over laterite, and lateritic gravel. About two miles on the east of Mangalore, on a



laterite hill in mid air was swinging (June 16th 1837) the decomposing body of the rebel, Bungar Rajah—the gibbet creaking in the wind. His predecessor had been hanged by Tippoo for his loyalty to the English! Arcola stands on the North bank of the Comardaire, or Southern Mangalore river, and is called Feringhipett, from the circumstance of its being the early residence of the Concan Catholic Christians under the protection of the Sekeri Rajahs, and who were latterly expelled by Tippoo when he destroyed the town. The remains of the old church stand on the hill, built in the usual massive Portuguese style. The tide is said to come up to this place.

Buntwal. Buntwal also lies on the N. bank of the S. Mangalore river. The country between this and Mangalore is hilly, composed of small hills and vallies watered by rivulets. Where rice cultivation does not prevail, the surface is covered with scattered brushwood and palm trees. The soil is red and lateritic. The hills are generally rounded, or run in the flat-topped, crescent-shaped curves, like those near Capergode. All that I had an opportunity of examining were of laterite; but hornblende rock containing a dark foliated mica, is seen in angular blocks in the bed of the river at Buntwal. The river here is apparently from 150 to 200 yards broad, and now (June 1837) unfordable. Native boats of considerable size ascend the river from Mangalore; Buntwal and Pani Mangalore being the principal entrepôt with the interior. The masses of rock in the river hed are considerable impediments.

In Buchanan's time (1801) Buntwal contained only 200 houses, but then it had suffered from the forays of the Coorg Rajah. It is now (1837) said to comprise 800 houses, inhabited chiefly by Moplay merchants, Concanis, and a few Jains. It is also capital of a taluk, with a population of about one lac, and a revenue of nearly two and a half lacs of rupees.

That curious sect the Jains, have a busti here. The charred rafters and roofless walls of many of the houses attest the ravages committed in the insurrection just quelled, (June 1837).

Uperangady. From Buntwal easterly, as the ghauts are approached, the surface of the country becomes more jungly, less cultivated, and less populous: the formation still laterite, covering granitic and hypogene rocks, which are occasionally seen in beds of rivulets and low



situations. The road still lies along the N. bank of Comardairi, or S. Mangalore river, which just below Uperangady bifurcates: the north stream descends the ghauts in the vicinity, and the south stream rolls down the steep of the lofty Subramani. The former is crossed to the village, now (June) unfordable.

Across this ford a dash was made on the insurgents by Colonel Green's force, the pagoda fired, and the principal idols defaced and broken; nothing remained but the tiled porticos and blackened walls. The natives were carefully collecting the fragments of their desecrated gods, and piling them up in the best order they could. The village is large and populous, and contains besides Brahminical temples, a mat'h of the Jungums, priests of the Lingayet sect, and a Jain busti.

Cuddab. From Uperangady to Neranky, and thence to Cuddab, the surface becomes more rugged and hilly, and the jungle, which is said to be infested by elephants and tigers, higher and thicker. The road leaving the northern branch approaches the southern, or Subramani branch of the river. One of its tributaries, the Dhillampari, is crossed by boat to Cuddab, a village containing many Concani Brahmins, with Goadahs, Tulavas, Bunters, Walliars and Jains, the last of whom have a busti here. I could scarcely find food or shelter, the shops and Traveller's bungalow having been burnt by the insurgents. The Bungar Rajah was, I believe, captured near this, in the house of a Jain. The geological formation continues much the same as on the last march.

Bottom of the Bisly Ghaut. The road to Culgund lies over hilly, jungly ground. Two small tributaries to the Subramani river, the Billola and Cuddoo, are crossed; both fordable, though the monsoon rains are now descending literally in torrents, and the rocks and precipies alive with leaping muddy rills. The jungle leeches were here equally alive, and vigorous in their insidious attacks, and before I was aware of their presence, had nearly fainted from loss of blood with which my shoes were filled.

The first sensation is that of itching; and, in withdrawing the hand from relieving that sensation, the traveller finds it covered with blood. In a state of fasting this animal is rarely more than an inch long, and hardly so thick as a small fiddle string. It has evidently keen powers of scenting blood, and if the traveller stop but momentarily in the road, they fasten on him in astonishing numbers, raising themselves on their

tails to strike like so many little cobra de capellas. Until gorged with blood, they move in this way with considerable rapidity. I have only found them troublesome during the monsoon, when the paths and trees are dripping with rain. In the dry season they retire to the marshes and other moist situations. Dr. Davy describes a similar sort of jungle leech in his History of Ceylon,\* and says that their bites have in too many instances occasioned the loss of limb, and even of life. He mentions various remedies, but I found the best was to wash the leg with tepid water at the end of the march; rest it, and to avoid, above all things, scratching the bite. In case of a wounded vein, burnt rag may be applied to stop the hæmorrhage.

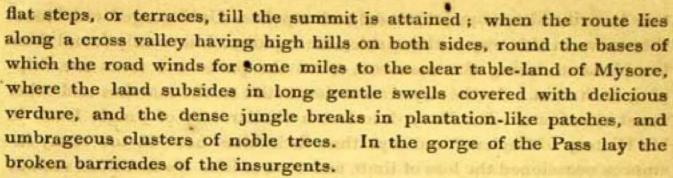
Culgund is a revenue chousie; contains about thirty or forty houses chiefly of Goudahs, Komtis, and a few Attiah brahmans; and was lately occupied by the insurgents under Appiah, Mallepa, and Timmapa Goudah, who were however soon dislodged by Colonel Williamson's force, which marched down the Bisly Ghaut from Bangalore.

About two miles from Culgund I crossed the Udhulla stream, which was then running with frightful velocity, on a rude raft hastily constructed on the spot of a few green bamboos lashed together.

The sand of this stream abounds in bits of garnet, quartz, and fragments chiefly of hornblendic rocks, which now become the principal surface rock, though covered by thick beds of red clay into which the hornblende schist passes by weathering. Laterite is now seen less frequently, as the ascent of the ghauts commences at the bottom of the Bisly Pass, about one mile from Udhulla.

Ascent of the Bisly Ghaut. The ascent lies up a transverse break in the lowered prolongation of the ghauts, immediately to the north of the mountain Subramani, and for some distance along the right bank of the Subramani river. This sacred mountain is the highest peak in this part of the ghaut chain, though only rising, it is said, to the elevation of 5611 feet above the level of the sea. Its summit was concealed in monsoon clouds, but its bare shoulders of grey granite rise in a magnificent sweep from the green forests which mantle its back, and fringe its base.

After leaving the river bank of the stream, the road leads for four miles up the steepest part of the Pass, relieved here and there by short \* Travels in Ceylon, pp. 103 and 104.



At the western foot of the Pass, and along the base of the Subramani, hornblende rock, containing garnets and dark-coloured mica, occurs, with veins of a very large grained granite composed of white quartz, red and white felspar, and silvery mica in very large plates: gneiss is seen on the steep face of the ghaut, and hornblende rock often coated with the red clay, and its own detritus. This formation continues to the summit of the ghaut.

Uchinghy. The formation here is generally gneiss. One of the hills of this rock is crested by hornblende rock in large prismatic masses. Patches of laterite occur, covering these rocks in various localities, and a few bosses of granite.

Kensum Ooscottah. This village is fairly on the table-land: near it I crossed the Hemavatti, one of the principal tributaries to the Cauvery, in a canoe. It is about fifty paces broad, with steep banks of clay, silt, and sand with mica. Near a temple to the Lingum in the vicinity of the village, mammillary masses of gneiss project from the red alluvial soil. This rock has here lost much of its quartz, and is of that variety of thick bedded gneiss which, in a hand specimen, might pass for granite; the felspar is often of a reddish tint. Laterite is found in this vicinity a little below the surface in a soft sectile state.

The face of the surrounding country is diversified with low-rounded hills, often covered with a red clayey soil, which yields during the moist months a verdant carpet of short grass.

Springs of good water are found at depths of from twelve to eighteen feet below the surface. Rice and raggy are the staple articles of cultivation.

Ooscotta comprises about one hundred houses, inhabited chiefly by Lingayets and a few Carnati brahmans of the Smartal and Sri Vaishnavam sects, and a few Dewangurs.

A solitary Sri Vaishnavam brahman resides in the fort. The fort is said to have been built or greatly improved by Hyder, but is a place of

no greater strength than the ordinary second class ghurries of S. India. It contains two temples, one dedicated to *Iswara* and his consort *Parvati*, and the other to *Angini Dewi*. There are two others in the Pettah, to Angini and Buswunt. The staple articles of cultivation are rice and raggy.

Pallium. The road from Kensum Ooscotta into Mysore, lies over an undulating country, on the surface of which the dwarf thorn and aloe begin to be more thickly sprinkled than nearer the ghauts. Gneiss still outcrops in mammillary masses from a reddish alluvial soil. Here is a Jain temple to Pursonath, and an old pagoda to Jinadur. There are several Jain families still residing here. Some miles to the N. is the famous ancient capital of Hallibede, where there are some Jain bustis. Most of the inscriptions I have had copied.

Hassan and Gram. Gneiss and hornblende schist are still the prevalent rocks. Talc slate with layers of a fine greenish potstone interstratified also occurs, of which the elaborately carved walls of the temple to Keysu Dev, are constructed. At Hassan there is a large fort repaired by Hyder and Tippoo, with a glacis, covered way, dry ditch, and a sort of fausse braye; also a Jain temple to Pursonath. Gram is also defended by a fort of no strength, and of considerable antiquity: it is quadrangular, and has square towers connected with a high stone curtain and a mud parapet, the whole surrounded by a dry ditch. It occupies a slight ascent. The mica in the gneiss near Gram is sometimes replaced by talc, and passes into protogine.

My attention in this part of Mysore was often attracted by heaps of stones near the road side to which, as I have seen in Catholic countries on spots where murders have occurred, the passers-by each added a stone. From some of these, half-gaten portions of the human frame often protruded, dragged forth by the hyænas or jackals. On enquiry I found they were the remains of the cultivating caste, called the Wokeligars, who, if they happen to die of a sort of leprosy called "Kor" or Thun, are not suffered by the Brahmins to be buried below the ground in the ordinary way, "lest no rain should fall in the land"!

Chinrayapatam. After exploring the Corundum pits of Golushully, &c. (described in the Journal Royal Asiatic Society, No. XIV. p. 219)
I passed through Kulkairy to Chinrayapatam, and thence by the Corundum localities of Appanhully and Barkenhully to Hirasaye, Cudhully, and Belloor to Ootradroog, granite, protogine, gneiss, talcose, and horn-

blende schists, penetrated occasionally by trap-dykes, constitute the formation, overlaid here and there by patches of laterite or kunkur, on which rests the surface soil. The latter is usually reddish and sandy. Sometimes these deposits are wanting, when the substratum consists of the gravelly detritus of the subjacent rocks. At Belladaira a large bed of ferruginous quartz occurs. Country bare looking.

Chinrayapatam was anciently a Hindu town of some importance, and governed by a Bellala prince. There is still a busti here to the 24 Pirthunkars. The fort was greatly added to by Hyder and Tippoo; but after all is of no real strength. The Hindu sculptures in the interior are for the most part executed in the potstone of the surrounding formation. Inscription on stone, dated 1400 A. S.

Octradroog. The mass of granite on which stands the Droog or fortress, is somewhat saddle-shaped, and runs nearly N. and S., it terminates abruptly at either extremity. The northern extremity, crowned by the citadel, is a sheer scarp of rock nearly 200 feet high: its base is rugged with large precipitated masses. The southern extremity is also fortified, and the two forts are connected by two walls running along and enclosing the entire length of the ridge on which stands the remains of a small village.

From the top is a fine view of the peak of Sivagunga, the highest in Mysore (4600 feet); and of the great rock of Severndroog. The granite is similar to, but less porphyritic than, that of Severndroog.

Ootradroog was stormed in 1791, by Colonel Stuart, just previous to the first siege of Seringapatam.

Severndroog. From Ootradroog I proceeded to Maugri, which has a handsome pettah, originally built by Kempye Goura, the founder of the fortress of Severndroog; and thence ascended the stupendous mass of granite on which stands the small pagoda and fort of Severndroog. The country for a considerable distance is wild and woody, abounding with low hills and rocks, among which a porphyritic granite prevails. The intervening vallies watered by the Arkawati and its tributaries, are in general well cultivated. A magnetic iron sand is found in the beds of almost all the rivulets, and smelting furnaces are numerous throughout this romantic tract.

The base of the great porphyritic mass of Severndroog is surrounded by tall forest trees, below which grows an underwood in which the



bamboo flourishes in great luxuriance. A deep ravine, forming a nullah bed, affords a convenient shelter for the wild beasts which infest it. Not far from the place where we crossed, I observed a capacious tigertrap. The place has been nearly deserted since it was stormed by Lord Cornwallis in 1791, from the deadliness, it is said, of the climate; caused most probably by the decayed vegetation of the surrounding jungles. It is said that the clumps of bamboos were planted purposely to render the place as unapproachable as possible; but the bamboo. from the nature of its growth, is a tree little likely to be selected by natives for this purpose.

I ascended the rock from the north-east side. The major axis of the mass runs nearly east and west, and is crossed at right angles by a profound fissure which cleaves the rock from summit to base into two distinct portions, both fortified, so as to be independent of the lower fort, which is extremely extensive, and vulnerable at many points. After the breaching of this outer wall the garrison, panic-struck, fled to the citadel, or Bala Hissar, on the summit of the western rock, which was deemed impregnable: but the troops in the heat of the pursuit. entered the gates with them, and in one hour gained possession of the place. The assault was made from the N. E. side. Tippoo, after the peace in 1792, regained possession, and added considerably to the lower works in the construction of batteries commanding the former line of attack, one of which goes by his name; another by that of Hyder, while a third is expressively styled the Shaitan, or Devil, battery.

The western rock, called by natives "Billaye," from the light colour of its surface, which I found was caused by a species of lichen, terminates to the westward in a lofty precipice, down which many of the terrified garrison threw themselves. On it stand the ruins of Tippoo's mosque, a powder magazine, and a few other buildings.

The western rock is called Kari, from its dark rusty aspect, caused by the weathering of its surface, and the oxidation of the iron in its mica and hornblende. Why the whole rock should be called Subarna, or Golden, the native guides could not inform me. It is entirely composed of a granite, which from small grained may be seen passing into the large grained and porphyritic varieties. Some of the crystals of reddish felspar on Kari durga, were nearly two inches long, imbedded in small grained reddish granite.

On the rounded pinnacle of a magnificent conoidal mass of this porphyritic granite overlooking the whole rock, stands a small, but picturesque temple to Busuana.

I descended by a deep fissure in the rock to the temple at the S. E. base, where some Brahman priests and their servants still remain. Here may be traced the vestiges of the old gardens of the Poligar builder of the fort—Kempye Goura.

Along the North base are a few caves formed by the covered spaces between large granitic blocks. I regret being unable to get a specimen of the Shin-Nai, or red dog, which Buchanan heard was to be found in the forests of Severndroog, and which is said to kill even the tiger by fastening itself on its neck.

The Shin-Nai, Buchanan says, is quite distinct from the wild dog, which is said to be very common here. The forest abounds with good timber trees, most of which Buchanan describes, and among which may be enumerated the sandal-wood.

Iron furnaces. I have previously mentioned that a magnetic iron-sand is found in great abundance in the beds of the rivulets of this hilly tract. Furnaces for smelting it are said to exist at Hurti, Kuncha-kanhully, Timsunder, Naigonpully, Ittelpully, and Chicknaigpully. I visited those of Kootul, (or Cotta,) of which a description will be given hereafter. At Ghettipura, in Tippoo's time, steel is said to have been made.

Taverikairy. From Kootul the Arkawatty river is crossed: country undulating, and rocky; for the most part uncultivated, and jungly. The principal rock at Taverikairy is gneiss, with fragments of iron shot quartz, green actynolitic quartz, felspar, fragments of hornblende, schist, granite, and basaltic greenstone scattered over the face of the country, and occasionally patches of kunker.

Bannawar. Near Bannawar I found diallage rock projecting in large, angular, scabrous blocks, from the top and sides of a low elevation. The great mass of the rock was chiefly white felspar and quartz. The crystals of diallage were well defined, and passed from dull olive-grey shades, to the lively decided green of smaragdite. There was more quartz in this diallage rock than is seen usually in the cuphotides of Europe; and the external aspect of the blocks was almost trachytic in its roughness. Not far hence, the gneiss, with which the diallage is



associated, apparently as a large vein, loses its mica, which is replacedby minute silver scales of graphite.

Nodules of lateritic iron ore occur, scattered with fragments of iron shot quartz, a greenish actynolitic quartz and felspar; fragments of hornblende, schist, gneiss, granite, and basaltic greenstone, scattered over the face of the country; and occasionally patches of kunker.

Bangalore. Gneiss is the prevalent rock about Bangalore, penetrated by dykes of basaltic greenstone, and occasionally by granite, as is seen near the pettah, and adjacent fields. The granite in these localities splits into the usual cuboidal blocks, or exfoliates into globular masses. It often contains hornblende in addition to mica.

The gneiss strata though waving and contorted, as seen in the rock in the middle of the tank near the Dragoon barracks, have a general N. and S. direction, and often contain beds of whitish quartz preserving a similar direction. The strata are nearly vertical.

Approaching Bangalore from the west, a bed of laterite is crossed, forming a hill on which stands a small pagoda. This bed extends northerly in the direction of Nundidroog, where laterite also occurs.

In other situations, covering the gneiss and granite, a reddish loam is usually found, varying from a few inches to twenty feet in depth, containing beds of red clay used in making tiles, bricks, &c., the result evidently of the weathering of the granite, gneiss, and hornblende rocks.

Colar. A similar formation continues to Colar, a small fortified town, notorious for its breed of vicious horses, and for being the birth-place of the celebrated Hyder. It lies about thirty-eight miles to the E. N. E. of Bangalore. The gneiss is occasionally interstratified with beds of hornblende schist.

The hill to the N. of the village, on which stands the ruined fort of Aurungzebe's General, Cassim Khan, breaks the monotony of the surrounding table-land. A spring and a small patch of cultivated land on this eminence, probably tempted this Mahomedan noble to make it his temporary residence.

Baitmungalum. Granite, gneiss, and hornblende schist are the prevailing rocks. Benza was inclined to believe that the blocks of granite seen in the plain, a mile or two west of this place and north of Golcon-dapatnam, are erratic boulders; but, after careful examination, I am

inclined to believe they are in sita, or very nearly so, and are merely rounded by the process of spontaneous concentric exfoliation elsewhere described. They are outgoings of great granite veins or dykes in the gneiss.

About eight or nine miles east of this, the Mysore frontier is crossed into S. Arcot. Kunker occurs on the banks of the rivulet near the village, both on the surface and in a bed below the alluvial soil. Efflorescences of muriate of soda are also seen in the vicinity.

Baitmungalum lies on the eastern flank of the gold tract which, according to Lieut. Warren, who examined this district in 1802, extends in a N. by E. direction from the vicinity of Boodicotta to near Ramasundra. The gold is distributed in the form of small fragments and dust throughout the alluvium covering this tract.

At Marcupum, a village about twelve miles S. W. from Baitmungalum, are some old gold mines, worked by Tippoo without success. The two excavations at this place demonstrate the great thickness, in some parts, of these auriferous alluvia. They were thirty to forty-five feet deep, respectively. The following is a list of the layers cut through.

## First mine.

- 2. Grey argillaceous earth with earth with gravel. gravel.
- 3. Deep brown earth, (No. 1.)
- 4. Hard grey and yellow clay.

## Second mine.

- 1. Deep brown earth, 11 ft. 1. Three feet of a black argillaceous
  - 2. Dark brown earth with stones.
  - 3. Hard clay streaked black and vellow.
- 5. Hard whitish argillaceous earth. 4. Hard large black stones, argilla-
  - 5. Black earth with gravel.
  - 6. Hard black clay.

The stones found in the hard whitish earth, No. 5, of the first mine, are described as of a siliceous nature, colour black, changing to a deep rust-colour where they seem to decay: a few parallel streaks, about which adheres a green and yellow substance, mark their value to the native miners.

The metalliferous stones in the second mine differ from the above, as they also differ in the matrix. They are of two kinds, viz. 1st, hard, black,



and argillaceous; and 2nd, hard, white, and siliceous. A deep orange soft substance adhering, marks their value. This substance appears, however, to be superficial, marking the surfaces into which the stone splits on being struck.

Lieut. Warren noticed that a sort of red earth, generally two feet deep, and succeeded by a white calcareous earth of equal depth, the under stratum of which consisted of large white decayed stones, seldom failed to contain an ample proportion of metal. The average proportion of gold to earth is as one grain of the former to 120 lbs. (avoirdupois) of the latter.

There can be little doubt that the auriferous black and white stones are fragments from the gneiss, granite and hornblende schist, which base this auriferous tract, and constitute the singular ridge which runs through it in a N. and S. direction, and which may be regarded as having furnished most of the materials of the reddish alluvium on its east and west flanks, and therefore as the true matrix of the gold. The orange-coloured stones I found to be caused by the oxidation of the iron in the mica.

Lieut. Warren had this alluvium washed and examined in various places throughout the gold tract, and points out as the most promising localities,—the Baterine hill and its vicinity N. of Dasseracotapilly, Corapenhully, Shapoor, Buksagur on the S. bank of the Palaur, five miles E. from Baitmungalum, Wurigaum, in a thick jungle W. of the village, which is situated about ten miles S. W. from Baitmungalum.

The process of extracting the ore from the stones is simply by pounding them, and washing the powder in water: the gold-dust sinks to the bottom. An equal proportionable quantity of gold is extracted from the powdered stones as from the earth.

The gold-dust obtained yielded on assay at the Company's mint,

94 per cent.

This auriferous range on the table-land of Mysore, may be traced to the eastern ghauts; southerly, by the hill fort of Tavuneri, to the S. of Caveripatnam mutta in the Amboor valley. Two Passes, however, break its continuity near Tavuneri.

To the N. it appears to terminate at Dasseracotapilly; though the line of elevation, taking a gentle easterly curve, may be traced by the outliers of the Baterine hills; Auminiconda or Awnee, Moolwagle, Coo-



roodoomulla, Rajeegoondy, to Ramasundra in the Cuddapah collectorate, a little W. of Panganores.

Vencatagherry. This is the first march from the frontier into N. Arcot. The formation is similar to that of Baitmungalum; but granite (the grey variety) is more prevalent, and the quartz more impregnated with iron. Magnetic iron sand is procured and smelted in the vicinity. It is found as usual mingled with quartz sand in the beds of streams which have their rise among the hilly tracts.

Naikenairy. A small village, formerly under the Poligar, situated at the top of the Pass to which it gives its name, and which leads down the ghauts to the plains of the Carnatic.

Evident marks of the great disturbance and dislocation suffered by the strata are visible in the rugged physical aspect of the country to the eastward, and further confirmed in examining the sections of the rocks, whose layers are found broken, on end, vertical, and at various other degrees of inclination down to the horizontal.

The grey granite which chiefly composes the ghauts here, is a compound of white felspar, quartz, dark green mica, and hornblende. The mica is sometimes seen in round nests as large as a man's head, which in weathering fall out, leaving corresponding cavities in the rock. These are seen in the faces of some of the precipices, and impart the appearance of having been caused by cannon-shot. Iron ore, and quartz impregnated with iron, are found in considerable abundance. Veins of quartz are common, also of reddish foliated felspar, either alone or with quartz, often coloured of a lively green by actynolite. When these three minerals are combined, the structure of the mass is not unfrequently porphyritic; small cavities lined with an orange-yellow powder are seen in the red felspar, also a micaceous brilliant metallic powder first noticed by Benza, and which he seems to think is cerium, but this idea has not yet been confirmed by chemical analysis, which is a desideratum.

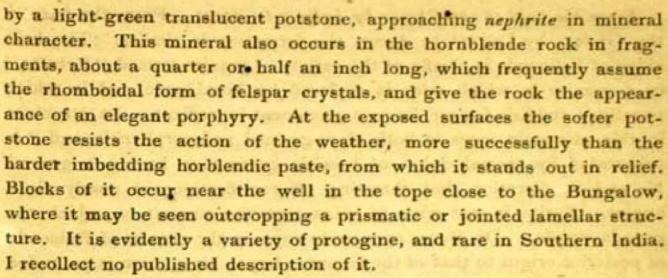
The descent of the ghauts here is steep and abrupt; and five miles and a half long from Naikanairy to the valley of Buttrapilly at the foot of the Pass.

The descents of the ghauts by the Mooglee Pass from Palamanair, and by that of Domaracunnama from Ryachooty, are by no means so abrupt or continuous as this: the formation is similar, but the ghaut chain is more broken.

From the base of the Ghauts by Lalpett to Arcot. From the base of the Ghauts by Lalpett to Arcot, the formation is similar. The bold ridge of Paliconda is chiefly of the variety of granite termed "Syenite," or a granite in which mica is replaced by hornblende, and in which usually a reddish felspar forms a prominent ingredient. Its structure in this mountain mass is both close-grained and porphyritic, and it is penetrated by several dykes of basaltic greenstone having a general N. and S. direction, but throwing off ramifications at nearly right angles. Eurite is met with in veins near the summit on which the pagoda stands. Dr. Benza appears to suppose the granite of Paliconda of posterior origin to that of the Ghauts; but as his opinion is grounded entirely on Lithological difference, and its association with eurite, basalt and porphyry, the age of which has not yet been determined, and which are moreover equally associated with the ordinary granite of S. India; we must hesitate before hastily admitting this hypothesis in absence of the other more decisive proofs of the age of Plutonic rocks derived from disturbance or non-disturbance of strata of ascertained age, with or without alteration, superposition, &c.

Poni. Near Poni, and Mymundeldroog a few miles to the N. E. of Vellore, granite still prevails, running in a broken chain of rocks up to Chittoor, and tilting up the hypogene schists. At Lalpett, between Poni and Arcot, is a ridge east of the Bungalow, having a S. westerly direction, and evidently an outlier of the great ghaut line of dislocation which sweeps in a curve from Naggery by Raj, and Chellempollium, to the Moogli and Sautghur Passes. The short ranges between Arcot and Vellore, those of Paliconda, Vanatedroog, and Javadie on the eastern flank of the beautiful vale of Amboor, are all equally subordinate to this line of dislocation. Through them by transverse gaps the Palaur, having traversed the longitudinal wall of Amboor, and the Poni, after having irrigated that extending from Chittoor to the N. bank of the Palaur, find their way easterly to the plains of the Carnatic.

The summit of the Lalpett ridge is crested with bare blocks of a dark massive hornblendic rock; but the great bulk of the hill is composed of gneiss penetrated by dykes of basaltic greenstone and granite, great disturbance in the strata is observable. Towards the N. extremity of the hill the gneiss is scarcely to be distinguished from the granite, except where large surfaces are exposed. The granite often passes into pegmatite. In some blocks I found the dull olive-green mica replace.



The sections of the soil afforded by the wells here, show,

1st. Three feet of a layer of reddish brown sandy loam.

2nd. One to two feet, gravel, angular and from the ridge.

3rd. One to two feet weathered rocky detritus, and kunker occasionally.

Caverypauk. From Lalpett the road lies by the populous town of Wallajah-nugger, on the North bank of the Palaur to the Caverypauk. The ghaut elevations, and their subordinates, have now been left behind, and the plains of the Carnatic are in front varied only by a few low hills near Wallajah-nugger. Near Caverypauk the fine white kaolinic earth, decayed pegmatite, of which many of the Arcot goglets are made, is dug.

Sri Permatoor. After a day's examination of the temples and sculptures at Conjeveram, I reached this birth-place of the celebrated Brahman Guru, and founder of the Sri Vaishnavam sect,—Rama Anuja Achari,—who is supposed to have flourished in the eleventh century of the Christian era, and converted many of the Buddhists and Jains, who then constituted the mass of the population, to the Brahmanical faith.

At Conjeveram, I was waited on by a number of Brahmans of the Smartal sect, whose Guru is Sencra Achari, priests of the great temple to Siva there. They complained much of the higher amount allowed to the great temple of the Sri Vaishnavam, at Little Conjeveram, viz. 12,000 rupees per annum, while that to their own chief is only 2,000. This difference they say originated in the partiality shown for the Sri Vaishnavam sect by the Hindu minister of the then Nuwab of the



Carnatic, the famous Wallajah. The other excts of Brahmans prevailing here are the Telinghi, Madual, and Shaivum; and it is calculated that Conjeveram contains nearly a thousand families of Brahmans of the above five sects. Remnants of the old Jain temples are traceable in fanes now occupied by their fierce Brahmanical persecutors; and there is still one family of this sect living at Conjeveram, and a small busti or temple at Tripetty Goodum, a neighbouring village.

In the erection of the temples, the Hindu architects like the Egyptians, in the N. and S. disposition of their walls, appear to have gone by the polar star or the rising and setting of the sun, rather than by the magnetic meridian. In their tanks near the place I observed both the sacred lotus or Tamari (Nymphæa Nelumbo,) and the smaller lotus, (Nymphæa lotus) called by Tamuls, "Alli," with its flower of the richest and deepest pink, studding the surface of the clear water which is often completely carpeted with its broad peltate serrated leaves. The seed of this aquatic plant is eaten, and also its root.

Much of the grey granite used for the foundation and lower parts of the Gopars, Vimanas, and walls of the temples is, I am told, brought from the rocks of Sholingur, about twenty-five miles to the west by north, and from Tirvaloor.

Some large blocks of a bottle-green hornblendic rock, resembling that of the Palaveram hill, were brought from Pattamully coopum.

Astronomy, for which the Brahmans of Conjeveram and Trivaloor were once so famous, is now at a low ebb. The Joshi of Great Conjeveram is a Telinghi Brahman, named Yaikambria, who adopts the tables of the Chandra Siddhanta of Anawa Ayenga, a Sri-Vaishnavam Brahman of Little Conjevaram; but the most celebrated Joshi lives at Caverypauk; he is a Brahman of the Smartal sect, named Rama Joshi. They calculate the movements of the heavenly bodies and eclipses for each year; the lucky and unlucky moments; and draw out written annual almanacs. But their principal occupation is astrology, calculating of nativities, horoscopes, &c.

Sri Permatoor. The plain around Sri Permatoor, as at Conjeveram, undulates slightly; and gradually inclines towards the sea coast, which is about twenty-seven miles to the eastward. The lower grounds are occupied by tanks, some of them of great size, as is the wet cultivation



they irrigate. The tank of Sri Permatoor is said to water 25,000 acres, chiefly rice-fields yielding two annual crops.

The higher grounds are often uncultivated, and covered with low bushes, chiefly of the dwarf date, (Elate sylvestris); the thorny carais, (Webera tetrandra); the fragrant Kellacheri; and the prickly pear, over which tower the stately fan-palm and cocoanut.

This maritime province of Chingleput, or "the Jaghire," the first ceded to us in S. India (A. D. 1763 by Nuwab Wallajah) has an area of 2253 miles; a revenue (chiefly derived from its wet cultivation, and the duties on salt manufactured on the coast) of nearly fifteen lacs of rupees, and a population of about 108 to the square mile.

The surface soil in the vicinity of Sri Permatoor is a sandy, reddish loam, overlying either thin beds of a loose coarse sandstone passing into white and ferruginous shales, laterite or kunker mixed with sand, or "chikni mutti," a tough greyish marl imbedding fragments of granite rocks, chiefly felspar. In digging for water near the village, the following is a list of the layers usually cut through.

1st. Reddish sandy loam,	5 feet.
2nd. Angular granitic gravel, granitic or lateritic, mingled with kunker,	3
3rd. Chikní muttí,	
4th. Loose sandstone,	4
5th. Sand,	2
the to refer the desirable of the second of the second	18 feet.

At Conjeveram the wells are much shallower, the bed of sand in which the water is found lies under similar layers of loam and chikní muttí, on an impervious bed of rock or clay. The Wudras tell me, there, that they never have occasion to dig down to the rock.

On the hard surface of the plain at Sri Permatoor are found, near the Traveller's bungalow, a few fragments of a hornblende rock resembling that of Palaveram, pegmatite, grey granite, a ferruginous hornblendic rock, white and reddish shales with edges little worn, together with a few scattered pebbles, well rounded, of a compact reddish sandstone or quartz rock, exactly resembling that of the Naggery hills,

about fifty miles N. of this. It is very evident, from their rolled aspect, that these hard quartz pebbles have travelled, and been subjected to the action of water in motion; but whether they have been washed direct from the parent rock to the place we now see them in, or whether they were once imbedded in deposits of laterite on, or near the spot, and which have since been swept off, is uncertain. A little farther to the westward of the bungalow, the surface of the plain is strewed with the harder debris of a bed of laterite, a circumstance in favour of the latter hypothesis, and among which are rolled fragments of a chocolate sandstone, exactly resembling those found by my friend, Cole, in the laterite of the Red hills. Rounded pebbles of white and red ferruginous quartz are also scattered on the surface, and beds of a fine light-coloured sand, like that of the Egyptian desert, and evidently not the result of the disintegration of rocks in sitû. In short, there is every appearance of this part of the Carnatic having emerged at no distant geological period from beneath the surface of the water.

From the little worn aspect of the fragments of the granitic rocks, and the softer shales, it is evident that these rocks are at no great distance hence in sitû: accordingly I continued my search in the plain to the westward, and at length succeeded in finding the white shale in sitû in the bed of a small stream which feeds the tank, and on its banks a light grey sandstone outcropping in the bed of a small pool; both rocks in horizontal strata, the sandstone overlying the shale. The sandstone is rather coarse or granular in structure, being composed of angular grains of greyish quartz held together by a white felspathic paste. In some excavations a little to the east of the bungalow, it passes both into a conglomerate imbedding small rounded pebbles of white quartz, and into a ferruginous sandstone resembling that imbedding silicified wood near Pondicherry. This sandstone, like the laterite with which it is associated, has evidently been broken through, and stripped off in many places by aqueous denudation, its strata being by no means thick or continuous.

It is found in the plain between Madras and Naggery in a more consolidated and compact form, and has been judiciously employed on account of its containing but little or no iron, by Lieut. Ludlow, in the construction of stands for the instruments in the Magnetic Observatory



of Madras. Its locality, according to native information, is about six miles and a half, E. by S. from Tripassore, a little N. of the Madras road, near the village of Permaul Naigpet. It here imbeds ferruginous reniform nodules, and a few pebbles of the older sandstone of Naggery, and makes an excellent building stone. Like the laterite, it is usually found occupying the higher parts of the undulations which traverse the plains of the Carnatic, in lines running parallel with the eastern ghaut chain, of which great dislocation they probably mark subordinate, synchronous elevatory forces. They are interrupted, usually, by transverse vallies, through which the great lines of drainage from the table-lands pass off to the sea.

I was unable to find the granite and hornblende rock in sitû, but I have little doubt that they are to be found basing the plain.

Concretionary sandstone sometimes occurs in the loam and silt overlying the sandstone.

A little to the eastward of the bund of the tank is a bed of laterite similar to that of the Red hills, the extent of which I had not leisure to trace. It is used for making roads.

Poonamalee. Between Sri Permatoor and Poonamalee, north of the large Chumbrumbancum tank, a bed of laterite runs to the northward of the road, which in structure resembles that of the Red hills, and another is crossed, or a spur of this, shortly afterwards.

A third bed is seen between Poonamalee and Madras, near Nabob's Choultry. They afford good material for making and repairing the road, which has been taken advantage of. The laterite enters into the construction of the fort at Poonamalee and St. Mary's Church at Madras; the base of the pedestal supporting the Munro Statue, the construction of the public roads, &c.

At Madras the soil is sandy, overlying beds of a bluish-black clay interstratified with layers of sand and reddish clay, and occasionally a bed of angular granitic gravel. The whole rests on the solid granite rock.



Account (Part II.) of parts of the Cabool and Peshawar Territories, and of Samah, Sudoom, Bunher, Swah, Deer and Bajour, visited by Mulla Aleem-ulla of Peshawar, in the latter part of the year 1837. Arranged and translated by Major R. Lerch, C.B. Late Political Agent, Candahar, under whose instructions the Tour was made.

"Moorcroft, Vigne, Burnes, Masson, Leech, and Wood, had travelled in the country, yet when General Pollock was at Peshawar and the Khyber closed, there was no trustworthy information to be procured regarding the Karifa, (Karapah?) the Abkhánah or the Tirah routes from Peshawar to Jelalabad."—(Recent History of the Panjab, from the Calcutta Review for September 1844.)

"Of the Kohistan (Eesafzai), my information is, I must confess, very imperfect, and will be here limited to nearly a barren detail of names."—(Captain E. Conolly, Asiatic Society's Journal, No. 105, 1840, page 929.)

"The much-to-be-regretted death of Doctor Henderson, has deprived us of authentic geographical knowledge respecting the valley of Suhát, Bonler, the valley of the Deer river, and the country of Bajáwar."

—(Vigne's Cashmeer, Vol. II. page 310, 1842.)

The author of the Recent History of the Panjab has gone considerably out of his way (even to the Haft kotal) to prove that every traveller across the Indus has failed both in his duty to his Government and to the geographical public, and seems to forget that a London publisher is not always the person to whom a Government servant should send surveys of Military Passes.

In justice to the late Cabool Misson of 1836-38, (two of whose members, Burnes and Lord, are dead, and a third, Wood, has retired from the service), I feel it a duty to record that before the advance of the Army into Affghanistan, Government was by the members of the Mission put in possession of surveys (made on horse and camel back) of the Khyber and Bolan Passes, and of that leading from Cabool via Bamian into Turkistan, and of accounts of all the other Passes leading from the Indus into Balochistan and Affghanistan, as well as of those leading from Cabool into Turkistan over the Hindoo Coosh. If the author of



the Recent History will refer to the published (not in Albemarle street) account of the Khyber Pass, dated Cabool, 1st October 1837, he will find the description of the three Passes of Tátára, Karapah, and Abkhánah thus prefaced:—"There are three other Passes, which are connected with this one (the Khyber), in as much as a simultaneous passage would most likely be attempted by an invading force through more than one."

The author of the Recent History also blames the natives of the country for calling the Pass, Haft kotal, and blames all Europeans for copying them.

While Darrah is a word applied both to a valley (Shahar Darrah, Shah Darrah), and to a defile (Darrah i Khyber, Darrah i Bolan), the word Kotal is applied to a ridge either rising from the plain or to the surmounting ridge of a Pass; and the Pass that puzzled the wideawake author of the Recent History, the "Daylight Traveller," to account for its name, is called Haft kotal, or seven ridges.

It is a pity, however, that the natives were not taught by our Recent Panjab authority to call it Haft kotalak, and that Europeans were not taught to translate it the seven paslets, and this new-coined word might be entered in the dictionaries in which Kotal is not to be found opposite to Kotalak.

The word for a ridge must not be confused with the one for a spare horse led in state before a chief. I hope the author of the Recent History of the Panjab will next give us the Recent History of the Protected Sikh States, and in the Preface parody the above quotation thus—

had travelled in the country, yet when the British attacking force was at Thanesir, and the insurgents in Kythul, no information regarding the fort was to be procured."

I was only three days in Peshawar in 1837, and was never again in that neighbourhood until with General Nott's force in 1842.

From Dacca to Peshawar there are four roads; the Khyber, Abkhanah, Karapah, and Tatara.

Dacca contains 100 houses of Momand Afghans, of the clans Alamzai, Morcha-khel, and Moosázai, who act as guards to travellers and kafilas, who without them are sure to be plundered.



No revenue is received from these people; on the contrary, they were always paid by the rulers of Cabool for keeping the above roads open, which they shut immediately their pay was stopt or kept in arrears.

Their charge for protection is,

On every horseman, or horse load, .. .. .. 2/3 rupees.
On every camel load, or pair of kajawahs, .. .. 3/3 ditto.
On every foot passenger, .. .. .. .. 2/3 ditto.

Their chief is Sa'adat khan, who has command of three of the roads, Tahtarah, Abkhanah, and Karapah, as well as the river route by raft from Jelalabad to Peshawar. He lives at Sulpoor on the other side (from Dacca) of the river. He is in the employ of the rulers on a salary of 12,000 rupees, and the Momands on the above roads, estimated at 45,000, acknowledge him as chief.

On every traveller by raft, one rupee is levied. The roads on this (the south) side of the river, which flows from west (Cabool) to east (Peshawar), are hilly, having many ascents and descents.

The road to Peshawar called Karapah, on the other side of the river, is also hilly and difficult, but not so much so as the others, it being possible, with management, to get guns over it. They have now stopped it up.

The other two roads, Abkhanah and Tahtarah, are safe.

The Khyber road is that for artillery and armies, but the Khyberies are great robbers, and often render a passage by it unavailable. Their word is not to be depended on. They are said to amount to 35,000 matchlock men. There are few habitations on the road, and even off the road they (the Afreedees) live a good deal in caves.

Their chief is Khan Bahadur, by clan a Malik Deen-khel. He and Saleem khan Jopa command 8,000. Abdul Kadar khan, Maddat khan and Alladad khan, Zakha-khels, command 10,000.

The Kukee-khels are 12,000. The Kumbar-khels 10,000. Alam khan Orakzai commands 10,000. The Shanwarees are 6,000. All these have their share in the Khyber.

Other portions of these tribes reside at Barah and Teerah, but they all have a share of the pay allowed by the rulers, and of the collections on the road at the tolls, and for Bodrakahs or guards, and all take their turn of service in the Pass.

From Dacca to Jamrood is in all 24 kos.\*

From Dacca to Huft Chah (7 wells) is 4 kos; these were sunk it is said by a Cafer king of old, named Bagram, for the convenience of travellers. In those days the land around them, it is said, was cultivated. Their depth has never been ascertained. They are situated on the high road, four to the East and three to the West of it. The place is infested by thieves, and there is no water or habitations.

The Khyber Pass is a defile between hills, the eastern one belonging to the Shanwarees. The road runs from North to South. From Huft Chah to this Kotal of Sande khánah, is six kos. Below the Kotal (pass) immediately on the road a little to the South, on the skirt of the hill near a ravine, there is a spring of water of one mill strength, flowing from East to West; to the West there is a very high hill on which is a fort of the above named Cafar king, said to have been destroyed by Hazrat Alle, who defeated him, and opened the Khyber. It is now in ruins; there is a little cultivation here, which is a Caffila and army stage. It is on the boundary of the Zakha khel, and Thanwareeg.

There are two roads up the hill, one to the East below the brow, having four windings and ascents and descents three kos in extent; the other by the stream along a ridge, two windings and ascents and descents one kos in extent, not a gun road. On reaching the top the road is again level to Gurheelalbeg, which is four kos and a stage. There are twelve small square forts, having each a lofty tower and eight guz high many of which are hostile to each other. It is the boundary of the Zakha khel. There are 1500 matchlock men in these forts. There is cultivation round the forts, but the inhabitants gain their livelihood by robbing on the highway.

Even when royal armies paid for their passage, the advance and

ar baggage generally suffered.

The Khyberee mothers are said to accustom their children from the age of five to six years to steal, beginning with neighbour's fowls, their spinning wheels and other household utensils, stinting them in food the days they are not successful. Sayuds, Molvees and Fakeers are not respected by them, and in stripping them, they jokingly say they intend to hang up their clothes as holy relics in their houses.

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From Gurheelalbeg to Alle Musjid, which is in the centre of the Pass, is four kos in a defile, the road is level and a stream runs in it.

Two kos from Gurheelalbeg towards Alle Musjid, from the hills to the West of the road, a spring of water of seven mill strength gushes out, and flows along the high road to the south.

In the Darah, there are Zaitoon, Baloot and other jungal trees. From this spring one short (kachah) kos further, the Pass contracts, and is covered with large stones, the water flowing over them; over and through which people get their beasts of burden with difficulty, and it is not even pleasant for horsemen. This place is reckoned the exact centre of the Khyber. From this gorge to the fort of Alle Musjid is one kos.

It is situated on a high hill, and was of old there. Dost Mahammud Khan, has rebuilt it for the protection of travellers, and for fear of the Sikhs, and garrisoned it with 100 men. It is very difficult of approach, and is situated on the hill that rises from the west of the road. There is a little level ground to the east. The fort was built originally by the kings of old, more it is said as a toll.

From Alle Musjid to Jabagai is three kos, a halting place, but no habitations. From Jabakee (also called) there are two roads. One to the south, called the Dahan-i-Darrah (mouth of Pass) road, to which entrance it is four kos, level and winding, abounding with canes and rushes, having a running stream. After leaving the Pass and entering the plain, there is a village of Khaleels named Jangoo.

The second road from Jabakee to the east is over hills known as the Shadee and Bagyaree road; it is winding, and the distance to Jamrood is four kos, in which there are three Kotals. Jamrood is the name of a village at which the Khyberees used to collect tolls, and give guards. One and a half kos after leaving the Pass there is a rising ground, on which Ranjeet Singh has built a new fort. From Jamrood to Pesawar is five kos to the east over a plain.

I give my Meerza's (he was so from 1838 to 1842) account of the Khyber, that from it judgment may be formed of the scrutiny with which he prosecuted enquiries.

The third road from Dacca to Peshawar is the Taktarah one, twenty kos in extent, very difficult, (the details are in kachah or short kos.) From Dacca to the east, three kos, is Kongah, having the river to the



north, and hills to the south. It contains 230 houses of Momands of the clan of Alamzai and Marchah khel, under Saadat Khan, and three Hindoo shops. From this village guards are procured, their chief is Daeem.

The rates for guards are,

A camel load or pair of Kajawahs,		 33	rupees.	
A yaboo load or horseman,		29	. ,,	
A bullock or ass load,		12	. ,,	
A foot passenger,	Anth	 2 3	"	

The guards are of the clans of Shanwarees and Afreedes, who with Momands and Balagoorees hold the road.

The chief of the Shanwarees is Rahmat Khan; those of the Balagoorees are Ahmad Khan, Rahat Khan, Afzal Khan and Shahnawaz Khan, Shamsodeen Khan, and Shahabudeen Khan. The Shamsarees amount to 8,000, the Balagoorees to 8,000, and the Momands to 4,000. They live in difficult parts of the mountains. They are by occupation guards and muleteers, many mules being produced in their country. Half a kos after leaving Kongah there is an ascent of one and a half kos, and after it a second; when both are surmounted, a plain is entered of four kos extent, on which off the road are twelve forts of Momands. There is a well on the road not bricked, is finished with masonry for the use of travellers.

From this well there are two roads; one to the south-west is the Rahtarah, and the one direct in front to the south, is the Abkhanah one.

On the Rahtarah road, three kos from the well, are two forts, which is the first stage from Dacca.

From these forts the road for ten kos is in a defile having a running stream, and plenty of trees, but no habitation. The stage is at the foot of a hill.

On leaving this a hill is ascended called the Koh-i-Khuda (hill of God) for seven kos. After which is a second hill called Koh-i-Rusool, (hill of the Prophet) having an ascent of six kos, and descent. It is also called the Tahtarah hill. There are other five lesser hills to surmount, having ascents and descents of three and four kos. There are no habitations on the road, but after descending each hill a small



stream is met, sufficient for drinking purposes. The Shanwarees and Balagoorees are here mixed.

For the next four kos the road is very difficult, over ascents and descents to the Darrah of the Balagoorees; after passing through which the village of Isportang, belonging to the Barozai Khaleels, on the plain of Peshawar, is reached.

The Abkhanah route from the well where the Tahtarah road branches of, is as follows:

One kos to the south from the well there is a Kotal to be ascended, after which for one and a half kos, there is a plain and then a second Kotal one kos to descend. At the bottom the Cabool river runs, and this is a stage; the ferry is called Guzar-i-Guttah, there is a small plain but no habitations, the inhabitants having their dwellings and shops in the hills above, for the accommodation of travellers by raft. On a Caffila arriving, these people descend and prepare rafts of inflated bullock hides to cross the Caffila, if they have Badrakahs or guards with them. It is impossible to cross the river but by raft, and as the stream is confined by high overhanging hills, it is very difficult to proceed along the bank over them, either backwards or forwards, a camel not being able to go. The stage belongs to the Momands under Saadat Khan. On crossing the river there is no open space, and a halt is made among the rocks on the river side, of only sufficient duration to reload the beasts of burden.

The road then for four kos, is an ascent up the brow of hills, without water or habitations, much infested by thieves.

Then the village of Hyder Khanee is reached, which is surrounded on all sides by hills. The inhabitants live in mat huts, which amount to 100, and there are 200 matchlock men; this is a stage.

Thence the next five kos are over ascents and descents; Zaitoon and Baloot trees are plentiful, as well as the matting grass; the coupation of the inhabitants is mat-making, men and women. They do not wear leathern shoes, but grass sandals, which they wear in and out of doors, on the hills and in the plains; they are called Chaplee or Psaplai.

Thence five kos the road is hilly, having ascents and descents to Michnee, which is situated below hills, on the river, which is to the south. There are two villages furnishing 700 matchlock men. The



names of their Maliks are Buland, Rustum Khan, and Rahmut Khan, Moorchuh khel Momands under Saadat Khan. Although on the river side, their lands depend on the rain, being elevated. The inhabitants' occupations are guards and grain merchants, carriers, and mat-making. On the other side of the river are the Buzazai Khaled Affghans dependent on Peshawar.

The river is crossed on rafts, the charge for a load being 2/3 rupees, for a foot passenger 1/12 rupee, for a bullock or ass 1/6 rupee. The Badrakahs from Peshawar toward Cabool charge as follows:

A horseman,			A	1 14		2 1/3	rupees.
A yaboo or mule	load,			10.		2 2/3	99
A bullock or ass,	• • 20 60		d was n	Hills warm	01444.9	1 2/3	"
Foot traveller,	**************************************	***		Me. 14		1/3	1100

The Badrakahs pay for crossing the rivers.

The fourth, or Karapah road, is as follows:

From Dacca the Cabool river is crossed by boat to Lalpoor, a large village, containing 3000 houses and 120 shops. Saadat Khan resides here. The distance by this road to Peshawar from Lalpoor is twenty-eight kos.

From Lalpoor to the north, at three kos, there is a Kotal called Khurpash, which is a winding ascent for four kos. It may be practicable for armies and guns. The next seven kos, to the stage, is level, which is called Murdar Dand; no habitations.

The next stage is eight kos, to Gandawah, also called Gandaw.

The road then goes eastward eight kos to Shabkadar, a village of the Duabah of Peshawur.

Between Murdar Dand and Gandawah, there are two small Kotals, and from the latter place to the mouth of the defile, there are two Kotals, one large and one small, and others besides. In the large Kotal there are capacious caves, in which merchants and travellers spend the night. The road of Karapah is held by the Alamzai Momands, under Turbaz Khan, the son of Mazulla Khan, a relation of Saadat Khan's, and chief of 24,000 men.

Of these four roads, I (Alle Mulla) travelled by the Abkhanah, to Peshawar.



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From a Dufter at Peshawar, I procured the following estimate of the area of the different dependent pergannahs:

		THE RESERVE OF THE PARTY OF THE	
· Total N	o. of Jarebs.		L'Europetanen a
Yoosafzai,	1,25,000	Bank S	distribuyed to the
Mandad,	1,00,000	can Strange Me	
Jagharzai,	22,000		
Bajour,	1,25,000	With the state of	ntervanius (E. Sati
Bunker,	22,000	or entitle	
	U	ncultivated	. Cultivated.
	3,94,000	1,34,700	2,59,300
Tarah and Bangash,	98,500	38,300	60,200
Orakzai and Bangash-i-P	ay-	145 D. LES	
ans,	98,000	48,000	50,000
Dahman and Banoo,	98,300	48,300	50,000
Khosh and Marwah,	. 98,000	48,000	50,000
Khattaks Balla and Haya	n, 1,90,000	40,000	1,50,000
Wazeerees,	3,00,059	1,00,050	2,00,000
Torees and Jajees,	1,60,000	60,000	1,00,000
Suburbs (Ahaf) of Peshaw	ar, 3,90,000		
Mohmands,	80,000		
Khaleels,	80,000	44,300	35,700
Daoodzais,	70,000	30,000	40,000
Khalsah,	70,000	35,000	35,000
Duabah,	70,000	30,000	40,000
Hashtnagar,	40,000	18,000	22,000
Gardens of Kashbah Bag	ram		of the St. Spile
and Shake Mahal,	40,000	7,000	33,000

Peshawar, by another account I procured, is said to have a revenue of 9,15,300 rupees, derived from 3,24,000 Jarebs, divided into 7 Pergunnalis. Pergunnah 1st.—The Khaleels 25,000 houses in 41 villages, yielding a revenue of 1,05,000 rupees from 70,000 Jarebs. The chiefs being Arbab Janea Khan, Sadmast Khan, and Arbab Zaeed Khan, Miuhee Khel Khaleel.

Pergunnah 2nd.—The Momands 38,000 houses in 55 villages, containing 84,000 Jarebs, under Ghazeedeen Khan, Kareem Khan, and Mahommad Khan, paying a revenue of 1,60,000 rupees.



Pergunnah 3rd.—The Duabah 25,000 houses in 5 villages, containing 70,000 Jarebs, under Arbah Abdulla Khan, Gagynnee Mandezai Khaleel and Arbab Hamza Khan and Arbab Sikandar Khan, paying a revenue of 1,50,000.

Pergunnah 4th.—Hashtnagur, 22 villages, 25,000 houses, 40,000 Jarebs, under Izzat Khan and Shahnawaz Khan Malmandzai, paying a revenue of 90,000 rupees.

Pergunnah 5th.—Daoodzais, 70,000 Jarebs, 20,000 houses, under Arbab Saadut Khan and Shahpasand Khan and Ahmad Khan; revenue 1,03,000 rupees.

Pergunnah 6th.—Shahee Mahal round the town, is applied to the cultivation in the old royal gardens; the Kasbah of Bagram contains 40,000 Jarebs, and pays a revenue of 50,000 rupees.

Pergunnah 7th.—The Khataks, revenue 1,50,000, under son of Abbas Khan and Ameer Khan, 70,000 houses in 67 villages.

There is a Tappah also, called Khalsah, that the kings of old did not include in their revenue, but set apart for their household expenses. The Barakzais collect, it is said, 56,000 rupees from it.

There is also the Sayer of Peshawar, called kacheree, which produces 1,25,000; another Pergunnah of Peshawar is the Eesafzais to the North, 130 villages and 2,25,000 Jarebs.

This tribe inhabiting Swat, Bunher, and Sama are estimated, or rather were, at 9,00,000 spearsmen and matchlock men. I have heard from old and respectable and well informed men of this tribe in Bunher, that Ameer Khan, their progenitor, had one son, Eesaf, who again had three sons and one daughter, Mandad, Malee, and Ako, and that the Malezais and Mandadzais inhabit Bunher, and the Akozais Swat, and the Tarkareen, called after the daughter of that name, inhabit Bajour.

That the Mandad and Razad clans of Mandezais inhabit the Sama (level) and have 69 villages, and musters 2,28,000 matchlock men, horse and foot, (2,09,000 foot, 19,000 horse,) and have 1,92,000 Jarebs of land. Should a powerful Government ever arise, 14,00,000 rupees might be collected.

The Malezais and Mandzais are in Bunher, having 70 villages and 1,00,000 matchlock men. It lies north of Sama, (93,000 foot, 7,000 horse.) They have 50,000 Jarebs of land.



The Akozais inhabit Deer and Swat, mustering 1,95,000 matchlock men. (1,48,000 foot and 47,000 horse.)

Deer and Swat contain 83,000 Jarebs. It's said that the whole of the Eesafzais matchlock men are estimated on the Hujrah. Each Hujrah contains 13 rebs, and each reb 19 zeer, each zeer 12 bakhrahs, (shares) and each share 9 keelbahs, and to each keelbah 60 seers seed, and for every seer seed one Jareb, and every share furnished six matchlock men, foot or horse.

The Eesafzais have another custom, that of changing their villages and lands every two or three years.

Another Pergunnah is that of Bajour, inhabited by the descendants of Tackareen, and contains 1,25,000 Jarebs. The kings of old collected 1,40,000 rupees, they are now independent. The chief is Meer Alum Khan, who has thirteen guns, and seventy Shakuns, and 2,000 Jazaeels of Zattulla Khan's time. This Zattulla Khan is said to have been a Lodee, left by Aurangzeb as Governor of Peshawar, and to have made 12,000 of these long pieces, for taking effect on the Teerahs and Khyber robbers on their heights, of  $2\frac{1}{2}$  gaz in length; these Jazaeels are called after him.

Bajour of old depends on Peshawar, from which it is N. W. It has to the north the Cafers,\* with whom constant war is waged.

Another Pergunnah is Cuner, containing 46,000 Jarebs, which paid 34,000 rupees to the kings of old. Ahmad Shah Duranne gave it to Sayad Hajeeh, whose sons are the present chiefs, one named Sayadwodeen; 20,000 matchlock men can turn out, (3,000 horse and 17,000 foot.)

No revenue was taken by the Sadozyes; Mahummad Azeem Khan, from Jalalabad, attacked Sayad Hajeeh, and making him prisoner, fixed the revenue of his country at 30,000 rupees. A further account of Cuner is contained in Part I. of this account.

The following is a more detailed account of the Duabah, which is inhabited by Zagyanees, under Arbab Abdulla Khan, and Sikandar Khan, sons of Hamza Khan, son of Ashraf Khan, of Shah Kadar.

They formerly received 4,000 rupees pay from the kings, and furnished 800 cavalry and 8,000 infantry. There are 48 villages in the Duab, containing 6,640 houses, and paying a revenue yearly of Rs. 1,21,310.



I also gained the following particulars of Hashtnagar. It contains twenty villages, and 40,000 jarebs. The revenue is 95,000 rupees. The ruler is Sayud Mahammad Khan, brother of Sultan Mahammad Khan. He has a body of 700 cavalry, and 400 foot. The villages are as follow:—

							William S. B.				
Noushera,		6000	Rs.	under	Mul	la G	hulam	Ka	dir,	3000	Jarebs.
Dheree,		1000								80	2)
Kheskhee,		6000								300	"
Nisata,		1000								70	51
Padang,		6000							***	200	,,,
Bhabda,		6000						• •		2000	"
Charsada,		9000								2000	,,,
Gudee Bayá	z Ni	1-	1								
jan,		2000	٢							400	,,,
Gudee Ham	ud		1			10.11					
Gul,		700	٢							100	- 13
Gudee Kaka	khe									150	93
Jum Daras	sha		,								
Nujan,		800	ì							150	33
Razad,		2000								300	,,
Oosmanzai,		6000								2000	,,
Omarzai,		4000								2000	,,
Sherzai,		6000								3000	,,
Gudee Bu	nda	100									
Nujan kh		1000	š							200	"
Tangee,										6000	. ,,
under Mala			ham	mad a	and'	Afzal	Khan				

The fort of Hashtnagar has two gates and two guns.

From Peshawar eastward, I proceeded twenty-four kos to Deree on the other side of the Sandye river, included in the pergannah of Hashtnagar, inhabited by Mahammadzais. The former chiefs were Meer Baz Khan and Shahnawaz Khan; the present are Meer Ahmad Khan, the son of Zardad Khan Bamezye, on the part of Sayad Mahammad Khan. The revenue is 1000 rupees, there are 700 jarebs dependent on the rain, and 200 jarebs watered by six wells. The river water is not available for cultivation. There are 200 houses



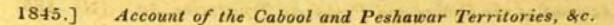
and four Hindoo shops, seventy footmen and ten horsemen. There is a ferry boat on the river, used by merchants who trade between the Eesafzais and Peshawar. Two crops a year are produced of wheat, barley, Indian corn, and cotton. The inhabitants are at enmity with the Eesafzais regarding the pasturage of their herds on the plain to the east. The river is to the west of the village in which there is an island on which cattle are grazed.

Three kos to the south is the village of Kheshkee, which is on the river also, having a ferry boat. There are two kandees, one called Bur kandee of Shekhs and Nujan khels, and the other kandee of Panchtana. The former has 600 houses, under Nujan Afzal and Nujan Ahmad Kheshkee. Panjtana has 1,700 houses and twenty-five shops of Hindoos. Both hamlets could furnish 300 matchlockmen, (260 foot and 40 horse.) It was formerly under Shahnawaz Khan Mahammadzai.

Between the two kandees there is an earthen mound on which are Cafer ruins. Across the river to the west there is a bela, (island) on which cattle are grazed. The river water is not available for cultivation. There are seventy wells in the village. The revenue is 6,000 rupees included in Hoshtnagar. To the N. E. there is a plain called Merá, on which the plant called, in Persian Ushlan, and in Pushtoo Sanari, which is burnt for ishkhar (potash,) which is exported in thousands of kharwars by Khattak and Ormar merchants. It gives a greater return for labour than cultivation of grain. The inhabitants have 1000 cows, 700 buffaloes, 4000 sheep, and many asses, and are chiefly traders. They were at enmity formerly with the men of Noushera and the Eesafzais, i. e. before Runjeet Singh subdued the country.

It is three kos from Kheshkee to Noushera south east. The chief was formerly Shahnawaz Khan, son of Faiztalah Khan; now Runjeet Singh has given it to Sardar Saiyad Mahammad Khan. The headman is Mulla Ghulam Kadur, the Sardar's Naib. Its revenue is 6000 rupees. There are 6000 houses, and 120 of Hindoos, and 200 shops, and 1000 matchlock men. The Parachahs are chiefly traders. The river is to the west of the village. There is a ferry boat.

Round Noushera there are 1000 jarebs of watered land, and 200 wells.



To the north of Noushera there is a hill called Tarkai, on which are the remains of Cafer buildings, and to the east there is a rising ground. Shahr-i-Safa, known as Shahr-i-Sabbak, on which are also Cafer remains, but no towers or minarets.

Below the skirt of the hill to the N. E. of the river are some houses of Afghans. There is another rising ground to the east, called Zadah Nujanah, and also the hill of A'dam and Durkhanee; the shrine of these lovers being below the hill on the south side, where there are also seventy houses of Afghans, and these two hillocks are near each other on the river between Noushera and Acora.

Across the river to the west there is another village also called Noushera, on the road newly built by Runjeet Singh, as is the fort. It was ruined by former rulers and by robbers. There are 200 houses a bazar, and a mandee.

I learnt that one Abdu Rahman, son of Imamudeen Parachah, a resident of Noushahrah, found a vessel of old gold coins on the neighbouring hill, and that on its becoming known, he suddenly decamped at night with his family to Kuram, in the vicinity of Bungash.

Leaving Noushahrah to the south, and passing the above hill, I entered the plain of the Eesafzais; the road leads through a defile in the hill called Tarkai, with difficulty passable to guns.

Two kos from Tarkai in the plain is a tank called Ateeh, and beyond it one kos, on the river bank, there is a road over an eminence on which are remains of Cafer buildings; and three kos further is another eminence called Dakhla, also having ruins on it. Two kos further is an eminence called Taree, also crowned with ruins, as well as with scattered houses of Affghans.

Two kos further on, there is a lofty eminence called Baba Deree, on which there is a square fort, built by Malik Daleel khan.

There are 700 houses of Eesafzais, and four wells and several young mulberry trees. The inhabitants are chiefly herdsmen: they are on good terms with Daleel khan, son of Jalal khan of Taroo, and at enmity with Ahmad khan, son of Lashkaree khan, of Hootee.

Half kos further on is the village of Toroo, and before reaching it is Kacho Daree, on which there are also Cafer remains.

There is a stream called Kalpanee, running from north to south through the village of Toroo, on which there are water wheels. Most

of the Mandad Eesafzais get their drinking water from this stream, which is fed from a spring. It has great capabilities, which might be brought to account by a powerful government. It is not much used by the tribes on account of their internal feuds. The villages immediately on its banks cultivate vegetables, Indian corn, and a little sugar-cane.

The reason that the Eesafzais never paid revenue is variously given. An account is, that the Eesafzais gave great annoyance to the authorities of the emperor Akber, when building the fort of Attock, and therefore when it was finished, a force of 12,000 men under the Wazeer Beerbal, was despatched against them, which was utterly destroyed by a miraculous shower of stones which fell on them in the Kala defile, brought down by the curses of a mad Eesafzai fakeer, by name Jahan khan, an Umar khel, who received some injury from one of Akber's authorities.

Akber granted them, in fear, a perpetual indemnity from taxation, and none of the Chaghatai, Moghul, or Affghan monarchs assessed them until the time of Runjeet Singh, who took advantage of their internal dissensions to get possession of the greater part of Sammá, from which he levies revenue only by yearly sending a large force to collect it.

Nadir Shah is also said to have remitted their revenue on account of their restoring to him his crown, which one of them stole while he was encamped near the Attock or Indus. Some say that it was remitted by a monarch, who became alarmed at getting 9,00,000 spears of revenue, which he once ordered to be collected at the rate of one from every house. Others say that it was remitted in consideration of the poorness of their country, and on condition of their eternally waging a religious war of extermination against their northern neighbours, the Cafers.

Mandad is said to have had five sons, whose descendants occupy the Sammá country of the Eesafzais (Afghanee) or Yoosafzais (Persian).

Kamal and Aman were two brothers, whose descendants were called, and are so now. Kamalzais and Amanzais.

The former are again divided into Mishar, (elder) Kamalzais, and Kishar (younger) Kamalzais.

The Mishar Kamalzais hold the villages of Hotee, Mardan, Mayar, and Baghdada, each containing about 2000 houses. Their chief oc-



cupation is trade in saltpetre. Their chief is Ahmad khan, son of Lashkaree khan of Hotee, who collects the revenue for Runjeet Singh from these four villages.

The Kishar Kamalzais hold the villages of Toroo, Ghala Deree, and Gujar Gadee, containing each on an average 2000 houses and 200 shops, to which merchants from Swat, Michnee, and the Punjab resort. Their chief is Daleel khan, son of Jalal khan, who is an enemy of Ahmad khan's, the latter having with the assistance of the Sikhs taken possession of his estates. Each of those villages could furnish 700 foot and 80 horse. Ahmad khan is a son-in-law of Anayatullah khan of Swat.

From Toroo to the east four kos are the Amanzais, who are again divided into Doulatzais and Ismailzais.

The Doulatzais hold Gurhee Amanzai, Gurhee Kapoorah, Shahbaz Gurh (Kot), and Derah Gurhee, each of which villages contains on an average 4000 houses, and could furnish 2000 foot and 200 horse. Their chiefs are Nasarulla khan, Namdar khan, and Ameer khan.

The Ismailzais hold Gumbat, and Barah Kot, and two other villages, each containing on an average 4000 houses and 200 shops, and being capable of furnishing 1000 matchlocks. They have to the west the Kalpanee stream generally speaking, but there are villages on either Their chiefs are Mansoor khan and Zyarat khan. Sardar bank. Huree Singh took away from the Ismailzais two guns that they had. The Amanzais have 3000 jarebs watered by the rain, and 1000 jarebs watered by the Kalpanee. They have internal feuds, and are constantly employed in fighting among themselves, or in robbing the highway. They are somewhat held in restraint by Ahmad khan, the Sikh spy. The ground on the borders of the Kalpanee, is capable of being cultivated to a great extent were safety secured the cultivator by a powerful government, and lacks of rupees of revenue might be collected; much of the land is capable of giving a ten-fold return on the seed.

The Sama country is bounded on the west by Asnee Kot, on the east by the Abaseen (Indus) at Amb, and Daraband on the south by the Attock (Indus), and on the north by Swat, Buner and Sudoom. It is 38 kos by 26. A particular account of the villages in it has been given to Major Leech, by Shekh Khashalee.

The country of Sama chiefly depends on the rain, and grows one crop. In some parts two crops are grown, where running water is procured.

The whole of Sama is said to be able to furnish 2,30,000 foot, and 12,000 horse.

From Gurhee Amazai to the north, towards Sudoom, fourteen kos, is the hill called Kadamar, beyond which is the village of Garyala, consisting of 100 houses on an eminence. This hill Pass is the boundary of Sama and Sudoom. The village contains seventy matchlocks, footmen, and six horse, under Lashkaree khan, who is at enmity with Mansoor khan, and friend with Nasarulla khan.

Two kos further is Gulyara, a fort on an eminence, of a square construction, containing forty kos within and 400 around it, with seven shops, and furnishing 200 foot, 27 horse, under Mansoor khan, and Yakoob khan, and Maddat khan. There are 700 jarebs in cultivation. Below the fort, there is a stream running from north to south.

Three kos further to the east is a hill called Doda, on which there are 400 houses under Afzal khan. Cultivation 600 jarebs.

One and a half kos to the north is the village of Sirah Derai, containing 600 houses, furnishing as many foot, and twenty horse, under Ashraf khan. Their lands are chiefly lalmee (dependent on rain.) They have some abee, (watered by streams or wells) also. The name of the stream is Naraikhod, which rises in the hills to the east. They are enemies of the men of Gurhee Amanzai, and friends with the men of Taroo.

Two kos to the north is the village of Machai, containing 160 houses, under Meer Mobean khan and Ismail khan. Cultivation, lalmee and abee, giving two crops. They are independent.

One kos further is the village of Char Gholai, containing 300 houses, under Ameer khan. Cultivation mixed, (lalmee and abee.) They use the water of the Naraikhod for drinking: they are independent. To the west in the plain trees abound.

One and a half kos further is the village of Osai, containing 200 houses, under Meer Mobean. Cultivation 700 jarebs lalmee, and 100 jarebs abee. The drinking water from the Naraikhod.

Two kos further is the village of Rustam, containing 600 houses, under Ramatulla khan. Cultivation 1000 jarebs lalmee, and 200

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jarebs abee. The drinking water is from a stream issuing from the hills to the north. They are independent.

One and a half kos further to the west is the village of Bazar, containing 700 houses, under Mansoor khan. Cultivation 2000 jarebs lalmee, and 300 jarebs abee. Drinking water from the stream.

Further on to the west off the road are the villages of Palee, Cheenah, Suroch and Landai, each containing 300 houses, under Sahab Shah Nujan. The cultivation of each, 1000 jarebs lalmee and abee.

Two kos further on is the village of Alee, containing 700 houses, under Mansoor khan. Cultivation 1000 jarebs lalmee, and 100 abec. Independent.

Further on four kos to the north-east, through a jungle over a winding road, two villages are reached, one called Peetawai, the other Syarai, under Malik Gujar. They each contain seventy houses. The hill which is here called Mabandarai, is the boundary of Sudoom and Bunher. The Khatak, Eesafzai, Samah and Peshawar merchants go by this Pass to Bunher. It is difficult for laden yaboos, bullocks, and asses. The ascent is four kos, and the descent two.

From the village the road leads to the north, winding up the hill which is very thickly wooded, the interwoven branches sometimes stopping the road; it is not of course a road for guns or even camels, a horseman being often obliged to dismount and lead his horse. Trees of different kinds, among them the Archah and Jalghoza, (fir and pine) are to be met with on these hills. The descent into Bunher from the top of the Malandasai Pass, is through a ravine. In this part of the country Mullahs and students (yalibilms), are much respected. There is no water in the Pass, or on the hills. In winter snow falls on the Pass, but does not lay on the ground.

One and a half kos from the Pass is the village of Zangee banda, in Bunher, in which there is no water. The inhabitants bring their water in pitchers from a spring at the foot of the hills to the north, one and a half kos distant. Cultivation 400 jarebs lalmee, and no abee. There are 130 houses, under Malik Kadazai.

On the road after descending the Pass, there is a shrine, or Mazar, of one Shekh Sher Kookho Baba, and a grave-yard. A fakeer, with his wife, officiates at the shrine. Kaffilas take a rest here. It is also a stage or halting place.



Three kos further to the north is a village called Nawai kilee, containing 700 houses of Burkhah-khel Eesafzais Bunherwal, under Zyarat khan and Meer Sahab khan. The cultivation is lalmee.

From this village to the east, in the hills, is a valley called Yoosaf Darrah, in which there are 400 houses; and adjoining it to the northwest is another valley, called Ghanum Darrah, containing 800 houses. Cultivation lalmee. Trees of the kinds Zaitoon, (olive) Baloot, (hollyoak) Archah, (fir) are plentiful, and serve for firewood. The interior of the valley is attractive and open, but the inhabitants are a lawless set, and have many quarrels at the time of changing lands. Their chief is Ahmad khan, son of Azad khan.

One and a half kos further on is the village of Kadappa, containing 300 houses, under Maddat khan and Muneer khan. Cultivation lalmee. Their drinking water is brought from a distance in pitchers on the head. They have large flocks and herds.

Two kos further north is the village of Pishtool Darrah, containing 1000 houses of Doulatzais, under Manzal khan and Natab khan, embosomed in hills. Cultivation 2500 jarebs lalmee. Their drinking water is brought from a distance from the east.

To the north of the village the road leads through a defile so narrow, that a laden ass passes with difficulty. Half a kos after getting clear of the defile a river is reached, flowing from west to east through hilly defiles, until it falls into the Abaseen. It fertilizes the whole of the Bunher lands, and those who inhabit its borders cultivate rice and chiefly live on it, boiled soft and mixed with ghee. The cultivation lalmee; wheat on rising grounds and skirts of hills.

To the north of the road across the river is the village of Shil Bandai, containing 400 houses, under Bahadur khan.

There is another, called Kalpanai, containing 500 houses, under Shahdad khan.

There is another, called Mash katta, containing 400 houses, under Fazal khan, and Bhadur khan, the son of Shahdad khan.

There is another called Kulgarai, containing 400 houses, under Nouroz khan.

There is another called Matwaridain, containing 2000 houses, under Mahib khan. They each cultivate the land of their bakhrah, or



share, and pay no revenue. Their Maliks only commanding them in feuds with neighbouring Khels.

Three kos further to the west, after crossing a rising ground, is the village of Dakad, containing 300 houses under Azeem khan.

Two kos further to the north, is the village of Derai, containing 300 houses under Hajeah khan.

Further to the left (north) of the road, is the Burindoo river, flowing from west to east; and to the north of the road, a hill has been cut through by some king of old to give the river a passage, through which it rushes with great violence. The volume may be of 100 mill strength. The breadth of the cut may be twenty paces or less; on each side of this hill there is a plain. The name of this cut is Soorai kand.

Five kos further to the west, is the village of Heelai, the road being very bad through jungle, and over descents and ascents. The head of the village is Futteh Ali khan, son of Madar khan, Ashezai. It is divided into fourteen hujrahs, contains 1500 houses and 47 shops. The merchants from the Khattak country bring salt, cotton, oil and cloth, and take away grain, ghee and honey, to Peshawar. The inhabitants drink the water of the Burindoo, on which there are 25 water mills, which grind flour for the whole country. The village is on a soft rising ground, on which there are fissures caused by the water on all sides. The river passes in rear of the village; to the south of it firewood and forage are procured from the hills. The country abounds with sheep, cows, buffaloes, and goats. They are friends with the Salarzais and enemies of Doulatzais. Cultivation on rising ground (lalmee) 2000 jarebs, and on the river bank (sbee) 1000 jarebs (rice and Indian corn).

Two kos further is the village of Dagar, containing 400 houses, under Bahadur khan.

Three kos to the west is a large village called Anghapoor, consisting of 14 Hujrahs, containing 2000 houses and 50 shops, under Jarwar khan and Rahmat khan. Cultivation 2000 jarebs lalmee, abee 1000 jarebs; the rubee fusul, wheat and barley; the inhabitants live principally on rice; they are enemies of the Salarzais and friends of the Noorzais.



Four kos further is a village on a rising ground called Torasak, composed of 18 hujrahs, and containing 2,500 houses and 50 shops, under Bulaud khan, who is a friend of Tallalee khan of Heelai, and an enemy of the Salarzais.

From Heelai five kos to the east, is the shrine of Peer Baba, the spiritual father, and place of pilgrimage of all the people of Swat, Bemher and the Eesafzais. There is a village also called Zyarat, containing 1,000 houses and 50 shops, under Myún Sayad, Sarbulund Shah and Myung Sayad Ahmad Shah and Afzal Shah, and Maliks Saádut khan, Tozal khan, and Ahmad khan. The Zyarat of the Peer is surrounded with numerous sheesham, zaitoon and mulberry trees. The Zyarat has no dome; there are two sarcophagus in the shrine of ornamented gypsum, over the tombs are narcissus, zumbuk and roses growing, and the mujawuns, or officiating priests, amount to 400 or 500; they receive all votive offerings and offerings as thanksgiving. The Shekhs and Sahabzadahs entertain all visitors and strangers. The whole people of Bunher are more or less influenced and guided by these Sahabzadahs.

Twelve kos to the north-west is the Kadakad hill, beyond which is the Pergunnah of Swat, and on the road are the following six villages.

1st. Kingar galai, consisting of 200 houses, under Shahbaz.

2nd. Chhurai, containing 300 houses and four hujrahs, under Abdulla khan.

3rd. Bazargai, containing 300 houses and four hujrahs, under Azam khan.

4th. Bam pookhah, containing 200 houses and four hujrahs, under Maddat khan.

5th. Johar, containing 300 houses and four hujrahs, under Maddat khan.

6th. Sugaren, containing 500 houses and four hujrahs, under Maa-

Each hujrah contains eighteen bakhrahs, and each bakhrah twelve rupees, (jarebs?) and to every rupee twenty foot men, and 2 swars. Every rupee contains sixty jarebs of land.

Their drinking water is from a stream that issues from a ravine. They are all Salaizais, and are at enmity with the Ashezais and

friends with the Doulatzais, and are independent. There are 2,000 jarebs of lalmee cultivation on rising grounds, and 1,500 abee on the banks of the stream, (Shelah.) The inhabitants are owners of large herds and flocks.

There are besides in all directions villages in vallies in the hills. For instance, to the east, near the Abaseen river, are the following:

Bagra, containing 500 houses under Buland khan. Babda ditto 400 ditto. Padha ditto 500 ditto. Chagharzai ditto 700 ditto, Aman khan. Marhad ditto 400 ditto. Kot and Cabal. ditto 700 ditto. Sahah khan.

The inhabitants of the above are Sherzais and Eesafzais. Their chiefs are Iman khan, Buland khan and Sahab khan.

The cultivation is 4,000 jarebs of lalmee, and 1,500 jarebs of abee, and each village contains two or three hujrahs each.

To the west is Ghazee khanah, containing 700 houses and four hujrahs, under Sarwar khan, Gudazai, the abee cultivation being from the Burindoo.

Three kos further is another village called Nadai, under Ralmat khan Gudazai, containing two hujrahs and 200 houses. The above two chiefs are friends, and at enmity with Mohsan khan Shamaszai.

Three kos further is a village called Bace, under Mohsan khan, containing 400 houses and three hujrahs, and the shine of Sultan Wais Baba.

There is another village called Badshah kilai, containing 400 houses of Gudazai, under Noor khan and Zattullah khan. I have heard, as I said before, from old and intelligent men of Bunher, that two of the three tribes of Eesafzais inhabit Bunher vizult, Maleezais, and Mandeezais.

The Maleezais are again subdivided into the following five gurohs, Gudazais, Salarzais, Ashezais. The tribe of Top Darrah, and Panch-pages.

The Mandezais are also again subdivided into the two gurohs of Doulatzais and Noorzais. The whole pergunnah of Salarzais, containing twenty-four hujrahs, on each of which matchlocks, horsemen, and lands are distributed. The chiefs are Kachkol khan, Baba khan and Alam khan.

The whole purgunnah of Gudazais, contains sixteen hujrahs.

That of Ashezais twenty-one hujrahs.

That of Top Darrah eighteen hujrahs, and that of Panchpaees twentytwo hujrahs.

The whole of the Maleezais have 101 hujrahs. The Doulatzai, Maleezais have thirty-one hujrahs, and the Noorzais forty-two hujrahs, making in all seventy-three.

The Gudazais are divided into four Tappahs. Husen khel to the east have four hujrahs, under Sarwar khan.

Husan khel to the north, have four hujrahs, under Kachkol khan and Baba khan and Alum khan. Aleesher khels, to the south, have four hujrahs, under Nouroz khan, Alee khan and Ahmad Shah Megan.

Ibrahim khels, to the north-west, have four hujrahs, under Deewan Shah.

Between the Aleesher khels and Ibrahim khels, there is a distance of five kos.

The Salarzai Maleezais have seven villages to the west.

Hujrai contains three hujrahs, under Shahbaz khan.

Seegaren contains four hujrahs, under Abdulla khan.

Kingargalee contains four hujrahs, under Azam khan.

Seiz contains four hujrahs.

Bazangai contains four hujrahs, under Azam khan; Johar and Bampookhah, contain each four hujrahs, under Sargandai and Hijran. They are enemies of the Gudazais.

The Ashezai Maleezais, have three towns. Heelai contains seven hujrahs, under Fattalee khan.

Aughapoor contains seven hujrahs, under Daum Shah.

Torahsak contains seven hujrahs, under Afzal khan; each of these towns has forty or fifty shops, frequented by Putwad Puklee, and Chuch merchants.

Top Darrah has four villages; two of them have three hujrahs each, and the other two four each, under Alam khan.

The Panchpaees have five villages; three of them four hujrahs each, and two of them five each, under Taoos khan and Ghazee khan.

The Doulatzai Mandeezais have three villages; Dagar has two hujrahs, under Shah Doula. Six kos to the south, there is a village called Bandeezai, having five hujrahs, under Fatteh khan.

Six kos to the east, there is a village called Thil bandai, having eight hujrahs, under Nizam khan.

The Noorzai Mandeezais, have ten villages, each of four hujrahs, to the north-west, under the Eelem hills; their drinking water being from the Burindoo river, and from springs, under hills to the south.

Their chiefs are Mansoor khan, Ahmad khan and Azad khan. The names of the villages are Kharappa, Reega, Noukalee, Sadacheena, Derai, Barkalaipanchpao, Deegda, Paltoreen, Kohkandee, two villages, upper and lower.

Another tribe, the Moleezais, are towards the east, at the entrance of a valley, at a distance of nine kos. They have two large villages, Kalpanee and Talpanee, having each four hujrahs, under Arab Shah Bunherwal. The Khattak merchants, bring salt, oil, and cloth, laden on bullocks; and take back, ghee, honey and rice. The Maliks levy from them as black mail, 1/24th rupee per load.

Bunher is surrounded or bounded in all directions by hills, that

have separate names.

To the east, is the Handoo hill, having an ascent of three kos, wooded with Jalyhozah, Archah, Zaitoon and Baloot trees, and frequented by monkeys, bears, hyænas, wolves, the hill Gongawaz, and wild goats and parrots, sharaks, and the seven colored bird, the kabk, the sisee.

Nothing is known of mines in this hill. Scanty streams are fed from the melting of the snows on these hills in the winter, and grazing is found on it for cattle and flocks in rich abundance.

This hill is within the jurisdiction of Ahmad Shah, and Deewan Shah, Alee, Sher khels. The road over this hill is not practicable for camels, it is difficult even for horsemen. The inhabitants on its skirts do not live in forts, but they are rich in flocks and herds.

To the south there is a hill and a Pass called Mah Bunher, thickly

populated, and having mines of zák and sulphur.

To the south are also the Malandarai hills and Ghudoo hills, through which there is a road taken by people from Samah to Bunher.

To the west there is a hill called Jafar, and another called Koh Kanda, abounding with masonry, remains of Cafer buildings, the ascent and descent of which is eight kos. It has no mines, is very

difficult of ascent, and snow falls on it. It is within the jurisdiction of Malik Buland khan, Sherzai; the alchemist's plant is found in it.

There is a hill to the north, called Eelam, or rather two, one called Loee Eelum, and the other Oodookai Eelum, having an ascent of four kos; snow falls on it to a great extent. It is in the jurisdiction of Shahbaz khan, Azam khan, and Abdulla khan, Salarzais, and Ahmad Shah Myan. In the Pass to the north is the splendid shrine of Sayud Meer Alee, Turmezai, known as Peer Baba. From the Handoo to the Jafar hills is twenty-nine kos, and from the Malandarai to the Eelum hills is twenty-five kos. The Burindoo river runs within these boundaries. It comes from the south by the village of Sugaren, which is in a valley and winding, and fertilizing the land on its banks goes east by the villages of Parbha and Jafarzai and Babda, and over the plain of Bakda and Marhad, and falls into the Abaseen.

After gaining this information I left Bunher for Swat.

The whole cultivation of Bunher may be stated at 50,000 jarebs lalmee, and 35,000 jarebs abee. It may be said capable of furnishing 60,000 foot matchlockmen and 5,000 horse, and to contain 111 villages, large and small.

From Bunher to Swat, there are three roads. One over the Jwaharai hills to the south, which are very lofty, having an ascent of seven kos, and snow always on its summit. It is not a camel or horse road, and foot-passengers even meet with difficulties. On the Bunher side of the hill there is a village called Poolhanad, containing 120 houses of Gudazais, under Myán Sayud, Amad Shah, a descendant of Myán Sayud, Munawar Shah, alias Peer Baba; and on the other, or Swat side, to the north-east, are two villages, called Sipal Banbai and Mingoda. This road bears north-east from Peer Baba. Their chief is Zaidulla khan, Baeezai Swatee; there are 700 houses. The distance from Peer Baba to Sipal Bandai is seventeen kos.

The second road is over the Karakar hill to the north-west. On the Bunher side is the village of Sagaden, containing 700 houses, under Najaf khan, Kasam khan and Nazeer khan. The ascent and descent of this hill is nine kos.

On the other side is a village called Nawahgai, and two kos further on in Swat is the village of Barah Kot, inhabited by Babazais, under Ghazan khan, son of Mahammud Jeev khan. This road is passable

for horsemen and laden bullocks, but on account of the robbers, guards are required. Many kinds of trees and wild animals are to be met with in these hills.

The third road is over the Kaleel hills to the south-east, and winding. There is a village on the Bunher side, called Garkand, containing 600 houses of Salarzais, under Darah Shah. The ascent and descent is five kos. The road is difficult, and little frequented. The hills are plentifully wooded. On the other side are the villages of Janbel and Kokarai, each containing 100 houses, under Zafar khan Babazai. From Gohkanda to Kokorai is eight kos.

I went by the village of Shkha kot. Of the tribes of Maleezais, Mandeezais and Akozais, the two former of which inhabit Bunher, and the latter Swat. The Akozais are divided into three tribes: Rarenzai, Baboozai, and Khwazozai.

The Rarenzais have 12,000 matchlock men, and 3,500 jarebs lalmee, and 1,500 jarebs ábee, and fifty-two villages, under Anayatulla khan, son of Abdulla khan, who himself has two villages, one on this side, to the west, towards Hashtnagar, and the other on the other side of the Mullah kand, called Allahohand, where he resides, to the east in lower Swat called Aswat.

Swat is divided into Sar Swat, Bar Swat and Deer, chiefly under Anayatulla khan, and a small part, under Zaidulla khan Babozai, and Ghazan khan Khwazozai.

Some of the villages under Anayatulla khan, are as follows:

Those towards the Mullah kand are fourteen in number, Vizut, Narai, Obo, consisting of 300 houses; Doobandai to the west, containing 400 houses, half a kos from Mulahkand; Bhorek to the west, one kos, containing 300 houses; Iskhakot to the west, containing 1,500 houses; Gadai, two kos, containing 400 houses. Heeran kot, containing 500 houses to the north-west, one and a half kos, having 1000 jarebs of lalmee; Dargai, two and half kos to the north, contains 1,500 houses; Kharkai, two kos to the north-west, contains 700 houses; Dareer, two kos to the north, contains 400 houses; Sanez, two kos to the north-west, contains 400 houses; Paroo, one and a half kos to the west, contains 300 houses; Kaldarah, two kos to the north, contains 500 houses; Kadam khel, one kos to the east, contains



200 houses; Baghdarah, one kos to the north, under the Malahkand, contains 150 houses.

Between Swat Proper and this Swat, is a hill over which there is a Pass; the name of the hill is Malah kand.

From Skha kot to the north-east, five kos, is a road partly through a defile called Jambar, through which there always blows a violent wind; there are two mounds in the defile, called after Adam and Darkhanai, because these lovers met there.

There is another unfinished road over the hill to the north, said to have been commenced of old by a monarch, named Kumran Shah, who intended by it to lead an army to subdue Swat, but died before it was finished, and the Swatees destroyed much of his work, and opened the road by the defile: traces of this road over the Malah kand are still visible.

The merchants of Hashtnagar, the Khatah country, the Duabah, and Samah, bringing Karbas-cloth, cotton and salt, on camels and bullocks, pass into Swat via Skhat kot, Dargai and Jambar, by the Malahkand Kotal.

The following duties and black mail are levied,

On a load of Salt, .. .. 3 shahees, (1/12th rupee).

Ditto ditto Cotton, .. .. 5 do.

Ditto ditto Ghee, .. .. .. 5 do.

Ditto ditto Cloths, .. . . . . 6 do.

by Anayatulla khan, for which he protects merchants.

The whole country of the Rarenzais, is under Anayatulla khan.

After passing the Malahkand, and entering Swat itself, the following Rarenzai villages, under Anayatulla khan, are met:

Shahar, of 200 houses; Dahrai, 200 houses; Jolagram, 300 houses; Matkaran, 200 houses; Hissar, 200 houses; Tootakan, 200 houses; Shaibetai, 400 houses; Batkhelah, 1000 houses; Nonkalai, 300 houses; Amankot, 300 houses; Allahdant, 2000 houses; Bandagai, 100 houses. Besides these there are many smaller villages, having twenty and thirty houses each.

The villages that I visited myself, shall be fully described.

Anayatulla khan has married the sister of Zaidulla khan, and thus cemented a friendship. By her he has several sons. He is at enmity with Ghazan khan of Deer, and Meer khan of Bajour.

There is another tribe in Swat to the East, called Baboozai, who have seventy villages and 18,000 matchlock men, (foot) under Zaidulla khan, the son of Hasan Alee khan, and Mazulla khan, the son of Jamand khan, a Khankhel. This tribe, especially to the south, is very unruly. Their lands are on the skirt of hills, and in valleys and on streams, some lalmee and some abee.

The river Sandai runs through the whole of Swat, from the boundary of the Rarenzais to that of the Banzais, is one and a half kos. The villages are: Bakhta, Tharan, Jalalah, Nawahgai, Natmeda, Dagai, Satmeda, Badeekot, Ashteekot, Amboohah, Garhatai, Panjgram, Karatai, Namee kalai, Bar kalai, Haibat gram, Koth, Kotagai, Mingrawad, Sangootah, Manglawar, Charbagh, Julaibagh, Teekdarai, Khoonah kateelah, Saidoo, three villages, Singuradad, Aleegai Sokat, Malhar, Kamharkalai bagh, Jooleezai, Alamganj, Matwarairi, Khwazah khel, Mirgai khel, Barah khel, Panjeegram, Hoodeegram, Jinkai khel, Nipkai khel, and Baloogram.

There are other smaller villages in the hilly valleys.

Zaiddullah khan pays in ready money, 200 Suwars and 500 foot.

The third tribe of Swat are the Khwazozais, under Ghazan khan the son of Kasam khan, the son of Mulla Ilyas, whose authority over his clan of Deer is great.

They are estimated at 38,000 matchlockmen. In the valley of Swat there are fifty-four villages, and in the valley of Deer sixty-two

villages.

There are two rivers in the Pergannah of Ghazan khan; the Swat river, flowing from south to north, called Sandai, and the Deer river. The villages are mostly in hilly valleys, and few in plains. There are high hills on all sides. The cultivation consists of 38,000 jarebs lalmee.

They are all under Ghazan khan, who in every village has posted a man of his own as Malik, to hear the complaints of the ryots. He takes 1/5 of the produce, or cultivates 1/5 of the lands. There are four small forts, each having 50 or 80 houses, and villages containing CONTRAC LEGACY

100 and 200 houses, populated on the hills. The villages of the plains have each from 500 to 1000 houses.

Samah and Khatah merchants bring salt, oil, cotton and cloth, and take away ghee, honey, rice and wheat, on bullocks and mules.

The people that he appoints as Hakims and Maliks of villages, have portions of land allotted to them in lieu of pay.

Ghazan khan himself resides in the fort of Deer, and has 140 horse and 400 foot constantly about his person, whom he pays in ready money. The following are the names of the hills in Ghazan khan's country,

First Maujah to the south, well wooded, having an ascent of four kos, and the same descent. There are plenty amlook and other trees; snow lies on the summit throughout the year. The road from Bar Swat to Deer leads over it, which is impassable to camels and horsemen, footmen even finding difficulties. Monkeys, apes, bears and tigers abound, and are to be feared, so are the thieves infesting it; such are not to be heard of in the jurisdiction of Ghazan khan.

The second hill is the Barawal to the west, having walnut as well as other trees. The ascent and descent are each five kos; much snow falls. There is an iron mine.

The third hill is that of Deer, to the north, very high, having an ascent and descent each of seven kos; snow always remains on it throughout the year.

The fourth hill is called Kumbad, to the east, the ascent is seven, and descent six kos. There is an iron mine, the metal of which the inhabitants extract. The road to Bajour passes this hill, frequented by Bujour, Deer, and Kashkar merchants. Ghazan khan is on friendly terms with Shah Katal of Kashkar, and Meer Alam of Bajour, and is at enmity with Zaidulla khan, Babozai Swatee, and Anayatulla khan, Rarenzai.

There are a number of hills besides these. The Khwazozais are divided in Maleezais, Shameezai Nurlee khels, Shameezais Pinkee khels.

The Shameezais to the west, muster 5,000 matchlock men, and have 3,000 jarebs of cultivation, under Buland khan, and Sara'ee, and Sayud Azam khan. The names of the villages are,

Barangola, contains four hujrahs, under Nahit khan and Buland khan.

Badawan, under Ojee khan, Ghawaz khan, and Sayud Azam khan, contains four hujrahs.

Chack Darrah, under Akal khan, and Dilawar khan, contains four hujrahs.

Sih Sadah, under Noor Alee khan, contains four hujrahs.

Ooch, under Ghulam Muhaiyadeen khan, and Maksood khan, contains four hujrahs.

Katyaree, under Raman Shah khan, contains five hujrahs. Shewah, contains six hujrahs, under Munawisar khan. Palah Mandai, under Hoora khan, contains four hujrahs. Neegwalai, under Ahmad khan, contains three hujrahs. Kajookam, under Fazal khan, contains four hujrahs. Damghar, under Ghafar khan, contains four hujrahs. Seen Sarai, under Aman Shah khan, contains four hujrahs. Gadai, under Nyamutulla khan, contains three hujrahs. Doorgai contains four hujrahs, under Assalla khan.

Chalgar, under Muazzam khan, contains four hujrahs.

Other villages are in the defiles, and on the hills, containing ten or twenty houses each. The inhabitants are owners of herds and flocks.

The Shameezais muster 7000 matchlock men, and have 11,000 jarebs; Beshah khan is their chief, and Kamal khan, Muazzam khan, Kahur khan, and Arsulla khan. The villages extending for fifteen kos, are the following,

Shilpum, contains four hujrahs, under Kahur khan. Shakur Darrah, contains five hujrahs, under Arsalla khan. Baba khel, under Muazzam khan, contains six hujrahs. Teensat, under Padshah khan, contains four hujrahs. Khadhadsha, contains four hujrahs, under Anwar khan. Baidarah, contains five hujrahs, under Kan khan. Dursha khel, contains four hujrahs under Kamal khan.

Kalat, the principal village of the Shameezais, contains fourteen hujrahs, under Beshah khan.

Sekhrah, under Kamal khan, four hujrahs. Doda, contains four hujrahs, under Ahmad khan. Dursha khel has four hujrahs, under Raham khan.

The Nepkee khels, called Naipee khels, Mirlee khels, extend twelve kos to the north. They muster 9,000 matchlockmen, and have 15,000 jarebs.

Jahkandara has four hujrahs, under Painda khan.

Kanjoor contains three hujrahs, under Ourang khan and Fazal Shah, and Roshan khan.

Neem galai, two kos to the south, two hujrahs, under Jamad khan. Dehli, one kos to the south, two hujrahs, under Arab Shah.

Barah Bunda, one and half kos to the south, contains four hujrahs, under Roshan khan, son of Arsalla khan, Neepkee khel.

Koozamandai contains four hujrahs, under Malah Shah, Meeran Shah and Arab Shah, one kos distant.

Damghar contains three hujrahs, at one kos to the south-west, in the plain from Barah Banda, under Rahmat Shah.

Dumgram contains two hujrahs, at one and a half kos, under Mahammad Zaman khan.

Koojkanjoo, one and a half kos to the south of the road in the plain, on the bank of the Swat river, two hujrahs.

Barkanjoo contains two hujrahs, under Nooran Shah and Shekh Gulpurust.

Their is a large village, ten kos from Kanjoo, having five hujrahs, under Gulistan khan, Paindah khan, and Shah Beg khan.

Two kos, on the skirts of the hill to the west, is a village called Seenai, containing three hujrahs, under Yoosaf khan, son of Umar khan.

Further to the north, is a village called Sar Sodai, two kos from Aleegram, containing four hujrahs, under Jadullah khan, and Faiztalab khan, Myan Ahmad Noor, Speen Myan Abdullah khan, and Awal khan, in the plain. Their drinking water is from a stream that comes from the Manjuh hills, to the north; the whole of the lands of Swat depend of the rain.

There is a village, Mandee, where merchants exchange their salt, cloths, and oil, and cotton, for rice and wheat. The copper coin current are Mansoorie pais or Mansoor khanee, and they prefer old round Ghunda rupees, indeed no others are current. There are no Hindoo shops throughout the country of the Pingee khels, the only merchants being Paranchas and Mullas, who command great credit; the people

are very unruly, but are held in some check by Ghazan khan of Deer.

Three kos to the north is the village of Toot Banda, under the Manjah hills, having three hujrahs, under Maddat khan.

To the north-east is another village, called Manjah, under the hill of that name, containing 127 houses, under Jalat Khan.

To the north, within the defile of the hill of Manjah, one and half kos, (the road over the hill leads to Deer) is the village of Kalakee, containing seventy houses, under Myan Ahmad Gul and Speen Myan; walnuts and Amlook trees are plentiful. I went by this road myself to Deer.

The Mooleezai Khwazozais inhabit the hill defile towards Deer.

Passing the Manjah hill there is the village of Tangee, consisting of two hujrahs, under Shad khan, under the hill to the west of the road.

Two kos further is the village of Kandareen, consisting of three hujrahs, under Mazroob Shah khan, Saidoo khan and Marghoob khan. A steam flows below the village, having its rise in the Manjah hills, of ten mill strength, and empties itself into the river of Deer. The people of the country live chiefly on rice.

Two kos further, in a defile, is the village of Chaghareen, consisting of two hujrahs.

One kos further is the village of Shakandair, consisting of two hujrahs, and containing 100 houses, under Noor Shas khan.

One kos further is the village of Ateetai, containing 100 houses, and consisting of one and a half hujrahs, under Sahab Shah khan.

Further, beyond the stream to the south of the road one kos, is the village of Razagam, consisting of two hujrahs, and containing 300 houses, under Kutub Shah khan.

After leaving the defile of the Manjah hill, is the village of Tor-Sang, two kos to the north on an eminence, containing 700 houses. It is on a table land, the ascent to which is half kos.

The road to Deer passes by it to the north. The Maliks are Buland khan, Alee khan, and Saadat khan. Under the village to the west, flows the river of Deer, beyond which to the west, are very high mountains. There are a very few villages across the river, not so on this side, as far as Deer.



Seven kos to the north, from Tor-song, is the village of Jughabunj, having 200 houses, and one and a half hujrahs, under Buland khan and Mahammad khan, and Mulla Sayad Aleg.

Four kos further to the north is the village of Bebiyoor, having 200 houses and one and a half hujrahs, under Ahmad khan.

Three kos further, is the village of Dardarah, having eighty houses, under Ameer khan and Buland khan, on an eminence to the east of the road to Deer.

Two kos further is the village of Hindookais, having eighty houses, under Afzal khan.

Three kos further is the village of Benimazee, having 100 houses. On the road there is a stream flowing from the hills to the east, and falling to the west into the river of Deer, over which is a wooden bridge, twenty-three kadams long.

On the bank of the stream to the east, is the village of Katalai, having fifty houses, and on the opposite bank is the village of Kadeckat, to the west.

Three kos further from this to the north, is the village of Kotalai. These villages are under Hasan Alee khan, a relation of Ghazan khan, chief of Deer, from whom he has them in jagire.

Two kos further is the village of Tangai, having 50 houses, under Ghulam Kadan khan.

Three kos further is the village of Hindookar, having 80 houses, under a man of Ghazan Khan.

Three kos further is the village of Jablook, on an eminence to the east, having 90 houses, under Azeemulla khan.

Three kos further to the north is the village of Kotakai, having 70 houses.

Three kos further to the north-east is the town and fort of Deer, under Ghazan khan, son of Karam khan, son of Mulla Ilyas, a Barah khel, Maleezai, Khwazozai, Akozai, Eesafzai, situated on a high tableland, 100 jarebs of which is cultivated.

The fort of Deer, which is situated on the table-land, is of an oblong shape, and has two gates that a horseman can ride through, one to the north facing the Kashkar road, and the other to the south facing Swat and Bunher. The walls of the fort are 12 zirahs high, 400 long, and 300 broad, having six bastions, five along the walls, and



one at the Harem Sarai of Ghazan khan. Within the south gate of the fort to the west there is a large mosk, where lessons are given by the Imam of the mosk, Kazee Abdurahman Akhund; and further beyond the mosk entrance to the west, is the residence of Ghazan khan. There are sixteen shops of Hindoos, five of which are grain-sellers, two druggists, and two cloth-sellers; and seven of Musulmans, four of which are goldsmiths, and three dyers: there are three black-smiths' shops, and two carpenters. There are 220 houses, and an armoury of 300 matchlocks, and fifty Jazaeers, each two and a half guz long.

Ghazan khan has seven sons: Rahmatulla khan, aged 12 years; Jahandad khan, ditto 9; Hameedulla khan, ditto 7; Habeebulla khan, ditto 7; Sultan Mahammad khan, ditto 5; Azeezulla khan, ditto 3; and Azeemulla khan, ditto 1 year.

He has four wives and many slave girls, and may be forty years of age; of a middling stature, fair complexion, and black hair. He is neither extravagant nor stingy, and is fond of hunting. He is on friendly terms with Meer Alam khan, and with Shah Katal of Kashkar, and at enmity with the Siahposh Cafers.

Deer is surrounded by mountains, on which snow lies all the year round. The country is very cold, and the color of the inhabitants is sallow from the disease of the spleen that they all have. They live chiefly on rice boiled soft, well mixed with ghee: wheaten bread they eat as fruit, (a treat). Their fires are lighted night and day on account of the cold. The ground is damp and swampy, therefore the inhabitants board their floors.

Fir, Pine, Walnut, and Amlook trees are exceedingly plentiful.

The gates of the fort are left open.

The manager of Ghazan khan, is one of his slaves, by name Abdul Kadar; and his confidential adviser is Kazee Mulla Abdu Rahman. Another of his slaves, by name Mahammad khan, is the fort Katwal. He has always in attendance 200 foot and 40 horse. He appoints others to districts and villages, from which they draw their own pay.

There are two roads from Deer to Bajour: one winding through defiles to the south-east, by the side of the river, towards the Kunateer road; the other over the Barawal hills, on the south of which is Bajour. It has an ascent of six kos, and a descent of three. It is





well wooded, and affords plentiful pasturage to the inhabitants. It is crowned with perpetual snow, and an iron mine is said to exist in it. It is not passable for camels, indeed the inhabitants know not the animal by sight. On the northern side of the hill is Deer; and on the southern side, in the Darrah of Jandawal, is the village of Akhund Mullah Timmur khan.

From Deer to the north-west are mountains inhabited by Neemchah Musulmans, in which the Musk deer abound, the hunting of which affords occupation for numbers. A quantity of honey is also produced.

Below the fort of Deer to the east, flows the river which comes from Kashkar to the north, and flows to the south. In it Otters are very abundant, which the inhabitants catch for the sake of their skins to make Posteens, or skin cloaks. These skins, with musk-bags, honey, ghee and silk, are articles of export.

Merchants from Kashkar and the Kohistan, bring Cashkar "Shalukees," and Chapkans (woollen fabrics), and in exchange take away grain.

The merchants from the Eesafzai country and Peshawar bring oil, cloth, cotton, sugar and spices, and take away musk-bags (Nafa), otter (Saglahoo) skins, honey, ghee, silk, and Kashkar "Shalakees."

The road from Swat to Deer is not practicable for camels, horsemen pass along the river with difficulty, merchants carry their goods on mules, bullocks, and men. The inhabitants know not what elephants or camels are.\*

I will give specimens of the dialects spoken by the Neemchah Mussulmans of the Kohistan, and by the people of Kashkar and the Baroohee (?) (Purmoolee)—(Furmulee).

A story is told illustrative of the gross ignorance of the primitive Affghans. A camel that had strayed from an encampment of merchants, found its way into a Barakzai khel. (they tell the story themselves,) where one had never been seen. The whole Khel was struck with awe, and were at a loss, all but the village Mulla, who, although as ignorant as his neighbours, determined not to appear so, and therefore boldly suggested, or rather affirmed, that it was the Almighty himself, which they all believed until a young one also made its appearance; and they enquired of the Akhund how the first one could be God as he had no fellow. The Akhund, not taken aback, boldly rebuked them thus: "Why, you fools! the second is the Prophet to be sure." This story I have heard half a dozen times from the blasphemy-dreading, holy-war-making Affghans!



After visiting Deer I returned by the road I came to Jaghayanj, twelve kos, whence to the village of Chakhai is five kos, and thence two kos to the east Atnar Darah. From this to the village of Tormany is three kos to the west, in a defile. In the road is a river which comes from Deer, and passing through defiles joins the Bajour river, which falls into the Swat river, which again falls into the Kunar and Cabool river, which finally falls into the Abaseen, or Attock.

Three kos from Tormang to the east, is a valley in which is the village of Khaeel, having three hujrahs and 600 houses, and close by is a square fort having four towers, containing thirty houses, under Irah khan. There are houses besides without the fort, and 600 jarebs of cultivation on the bank of the river.

From Bajour as far as Khaeel, there is a gun-road, but not so into

From the above place, one kos, there is a village on an eminence, containing 160 houses and one hujrah called Manjai, under Shadee khan. One kos further to the west there is a large fort containing 200 houses, and a large village containing 1000 houses, under Muckum khan and Shadee khan, called Kilah-i-Shadee khan. Half a kos further is the large village of Kanateer, containing 2000 houses and 40 shops and 16 hujrahs. It is a mart for merchandize, under Naseem khan and Umra khan, each of them have 40 horse and 2000 matchlockmen. The boundaries of Bajour Swat and Deer meet here. The place is under Ghazan khan.

Three kos to the west is the village of Dedai, having 160 houses, under Faiztalab khan.

Here two roads separate, One to the south-east, through the defile of Katgallah leads to Swat.

The other to the north leads over hills to Bajour via the village of Karhadah. Thus from Derai comes the village of Khemna, containing 200 houses, under Abdulla khan, Farkaride, in Bajour, the road is through a narrow defile which is passable for guns.

Five kos further to the south in Bajour on a plain, is the village of Kadhadah, and on the road there is a square fort built, containing 120 houses, under Faizulla khan.

To the south are hills inhabited by Utman khels, amounting to 10,000 matchlockmen, an unruly set, independent of Meer Alam

khan, of Bajour, and of Ghazan khan of Deer, and of every one else. They are noted for bravery, and live in houses and caves on the hill sides. These hills are partly in Bajour and partly in Swat, and are full of remains of Cafer buildings, from which the Utman khels extract copper coins and utensils, and often gold, and sell them in Bajour. The road over these hills is very difficult for horsemen; merchants cross with guards with fear. Meer Alam khan tries to conciliate them, as he fears them.

He has more than once taken a force against them, which they have as often defeated. The chiefs of the Utman khel are Khad, Umra, Narai, Bandil, Dilban, and Mardan. They bring honey, oxen, sheep and ghee to Bajour for sale, and purchase cloth and salt to take home.

They sometimes propose to take service, and get jagires and lands allotted for their support, but as soon as they reap their harvest they take to plundering their neighbours, and then to their hills, and defy Meer Alum khan. Every one is chief of his own land, and is under no control. Wheat is much cultivated in these hills by means of springs. The hills are well wooded, and game of every kind is abundant.

From the above village of Kadhadah one road leads to the east to Swat, thus,

Two kos from Kadhadah in the plain, is the village of Gulderee, having 400 houses, under Mulla Daraz Akhunzadah. Thence the Shekah road leads to the east.

Two kos further is the village of Chinah, having seventy houses, beneath which flows the river of Bajour. The land has capabilities, but the tyranny of Meer Alam khan has laid it waste. Guldad khan, a man of Meer Alam khan's, is their immediate ruler.

One kos further, on an eminence to the east of the road, is the village of Yakbur, having eighty houses, under Mahammed Ameer khan, over a bad narrow stony road, very difficult, for camels.

To the south-west of the road is the junction of the Deer and Bajour rivers, whence they run in one stream to Swat; the road is in a narrow defile called Shikah.

Six kos further is the village of Shamsee khan, on the skirt of a hill to the south of the road, having 850 houses and ten shops. The cultivation is chiefly in the plain to the north, lalmee. The chiefs are Afzal khan and Misree khan, it is in Swat.

One kos further to the east, on the road, is a large square fort, containing 200 houses, where Misree khan, a man of Ghazan khan, is stationed to collect duties from merchants trading between Bajour and Swat, bringing from Swat salt and oil laden on bullocks. From each load, whatever it may be, 3 shais and 2 paisa is levied, which in the year amounts to 7,000 rupees.

Two kos further to the east is the village of Amlook Darrah, to the south of the road, containing 400 houses, under Padshah khan.

On the hill to the south there are six towers of a large size, and . other marks of buildings.

On eminences and in valleys there are very many villages in a good state of repair, having no inhabitants, but difficult of access. The chiefs are Anayatulla khan and Khairulla khan; copper and gold coins are found in these deserted buildings.

Two kos further is the village of Nasapa, containing 100 houses, and many remains of ancient buildings, which no doubt composed towns.

Two kos further to the south is the village of Gumbat, containing 200 houses, behind which on the hill skirt is a very large tower of the times of the Cafers, of excellent construction; but the villagers have pulled it down in parts to make their houses of its bricks and stones.

It is hollow, and has three doorways, the entrances through which are winding. It is said that below this dome the treasures of the ancient kings lie buried.

I visited the place, and searched in vain for an inscription. It is situated in the boundary of the Khwazozais, under Ghazan khan.

Two kos further is the village of Katgalah, containing 100 houses, the road is difficult for camels. Here also on the skirt of the hill, ancient buildings are numerous, like deserted towns. It is in Swat, under Ghazan khan.

One and a half kos further is the village of Talash, on the road at the entrance of a defile, having 200 houses.

Passing the defile a plain is entered, having 500 jarebs of lalmee cultivation, and 100 of abee (rice).



Two kos further are two villages, called Chounce, containing each 400 houses, under Sayad Aman khan, Swatee, a man of Ghazan khan, the inhabitants a lawless set, and no one cap pass the plain without guards, which is called the Dasht of the Shamseezais.

Three kos further to the north, is the village of Shewah, having 800 houses and twenty shops, a mart for merchandize, under Ghazan khan, being on the mercantile route from Bajour to Swat, about 2000 jarebs of lalmee cultivation.

Four kos further to the south east, on the banks of the Landai Swat, there is the large village of Chakdarrah, having 1,200 houses, mostly merchants, included in Swat. Shamseezais by tribe, under Ghazan khan, six hujrahs.

Below the village to the west, is a ford across the river, (no boats or rafts.)

Beyond the river is the boundary of Anayettoola khan, Rarenzai, and the village of Alladaud, in which he resides; on the other side are the Shamseezai Khwazozais, under Ghazan khan. This is the boundary.

There is another road to Bajour from Kurhadab, six kos is the village of Munda, having 2000 houses and 100 shops, under Mahammad Ameer khan, Kochai, brother of Meer Alam khan.

The whole pergunnah of Bajour contains 1,25,000 jarebs, and its revenue amounts to 2,60,000 rupees, in ready money and kind collected on the seed (Kalang), of which Meer Alam khan receives 2,000,000 with his brothers, 40,000 rupees is received by Ameer khan, of Nawazai, an enemy of Meer Alam's, and 20,000 rupees is received by Ghafar khan, the son of Haiyat khan, the chief of Jandawal and Barawal, who is also an enemy of Meer Alam khan's.

The following are the boundaries of Bajour. To the north in the direction of Deer, the Jundawal and Barawal hills; to the south (twenty-five kos length,) the Darrah of Nawazai, and the pergunnah of Kunar. To the east the Darrah of Badwa and the hills of Cuner; to the west (twenty kos breadth,) Pashit and the Darrah of Baboo Karah.

The chief within these boundaries is Meer Alam khan, the son of Allaiyan khan, Salarzai Tarkadeir.

He has thirteen guns, (seven iron taken from Ghafar khan, son of Haiyat khan, and six of copper,? of his own.) forty Shaheens, 700 large Jazaeers, 8,000 foot, 2,000 horse, six pairs of state drums and

twelve state horns; (Karna,) and standards; in fact he keeps up a regal state. Besides he has Jagiredars.

His whole yearly expences amount to 1,12,000 public, and 8,000 private (stable, table and wardrobe,); 50,000 rupees he pays as revenue whenever any one on the part of the king is sent strong enough to enforce the payment, the remaining revenue enters his treasury.

He has absolute authority over his people, even extending to their wives and daughters, and no one demurs or objects to his disposing of their sisters and daughters.

His friends are Ghazan khan of Deer, and Anaiyatalla khan of Swat; and his enemies are Ameer khan of Nawazai, and Ghafar khan of the Darrah of Jandawal, these he has partially subdued, and possessed himself of parts of their territories.

He is also on friendly terms with Sardar Sultan Mahammad khan, Barakzai, of Peshawar.

Six of his guns are alone mounted on carriages.

The following are the principal places of Bajour :-

Gumbhad, in a valley to the east, under Myan Sahib, furnishing 300 matchlockmen, revenue 3,000 rupees in money and kind. There is an iron mine in the hills, they were formerly under Ghafar khan, now under Meer Alam bhan. They collect the iron from the sand of river beds. The pay of Myan Sahib is 800 rupees.

Jundawal is a valley of the Barawal hills, extending to Deer to the north, under Sifat khan, 4,000 matchlockmen, revenue 5,000 rupees. There is an iron mine which is worked. The pay of Sifat khan is 1,000 rupees.

There is another village in the valley of Maidan, which commences in the Kashkar hills to the north, itself bearing east. The inhabitants are Purmoolee, (Barhooee?) under Meer Aman khan, 2,000 matchlockmen. Revenue 3,500 rupees, pay of the chief 400 rupees. There is an iron mine in the Maidan valley, and a river running from north to south. Kanbat, consisting of 9,000 houses with its dependent hamlets, 5,000 matchlockmen. Iron is found in the neighbouring hills which border on Kashkar; name of the chief, Meer Aman khan, son of Meer Alam khan. Revenue 10,000 rupees in money and kind. His

jaghire, Maiyar, rent free, the estate of Myan Shekh Umar, of Cham-kanee. Revenue 7,000 rupees under the Myan's daughter. It contains 3,000 houses and forty shops. It is resorted to by merchants, who bring from Kashhar, silk shalakees and chughas, and take back salt, cloth and cotton. The inhabitants were ryots of Ghafar khan, they are now of Meer Alam khan.

From Maiyar, northwards to Zar Mandoo, there are four forts of Shekh khels, under Doola, brother of the late Mujabid khan, 2,000 machlockmen and 4,500 houses. Their custom is that every one who holds three papatahs of land must furnish a matchlockman to the ruler. A papatah takes three kharwars of seed.

Mundah, in jagire to Ameer Mahommad khan, alias Kochai, brother of Meer Alam khan, a brave soldier, having command of 12,000 matchlocks, (footmen,) and 100 horse. He sometimes rebels against Meer Alam khan.

There is another village in a valley called by some Shikah, having eight forts, by tribe Utman khels, who take service under no chief, nor were they ever. When Meer Alam khan marches against them, they declare themselves subjects, and Meer Alam contents himself with their nominal submission, and retires.

There are four forts to the west, called Wadah Banda, in jagire to Juma khan, brother of Meer Alam khan, who has command of 6,000 matchlockmen, and forty sowars, and is night and day employed in hostilities with the Utman khels; revenue 7,000 rupees, his jagire.

The Shahar, or capital of Bajour, is the residence of Meer Alam khan himself. It contains 1,000 houses and eighty shops, and is a mart for merchandize; revenue 9,000 rupees.

In the hills to the west, in the valley of Rodbar, are the tribe of Mahmoodees, who muster 10,000 matchlockmen, they have no Maliks; revenue 4,000 rupees. If the ruler is strong they pay, otherwise not.

To the north is the village of Pishut, in the valley of Baba Karah, in jagire to Paindah khan, brother of Meer Alum, 4,000 matchlockmen; revenue 7,000 rupees; tribe Salurzai Ibraheem khel.

There is another village to the west, called Chahar Sang, furnishing 3000 matchlockmen, under Meer Alam khan.



There is another village called Kotakee, 3,000 matchlockmen (foot) and 1000 horse, in jagire to Meer Aman khan, son of Meer Alam khan revenue 2000 rupees.

Another village is Nawahzai, the residence of Ameer khan, the enemy of Meer Alam khan. There is also a fort on an eminence, stony and difficult; there is a spring in it. The fort has eight towers.

There are houses right and left, under the fort in the valleys east and west of the fort, the road through them running north and south. The garrison of the fort consists of 500 footmen and 400 sowars. Jazaeers are mounted all round the fort walls, as are two guns. He has 2,000 footmen and horsemen, and his expences are 20,000 rupees, and he collects his revenue on the kalang. The position is a strong one, and Meer Alam khan can do nothing against it. He is on friendly terms with Ghafar khan, with Saiyad Bhawadeen Padshah, of Kunar, and with Ameer Dost Mahammad khan of Cabool and with the sons of Fatoolah khan of Goshta.

He is powerful, conciliating, and of a liberal disposition, and has absolute power over his subjects.

The Safees of Surkh Kunar are also subjects of Ameer khan, amounting to 6000 matchlockmen, who reside in the valleys of the hills, their cultivation depending on the rain; they have scarcely sufficient drinking water for themselves and cattle.

The Busham or capital of Baldur, as the residence of Moses Alata dank himself. It contains \$ 000 houses and cashey strope, and in a

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Proceedings of the Asiatic Society of Bengal, October, 1845.

The monthly meeting of the Society was held on Friday evening, the 3rd October, at the usual hour, S. G. T. Heatly, Esq. senior member present, in the chair.

The proceedings of the meeting of August were read and confirmed. The following Members, proposed at the August meeting, were ballotted for and duly elected: C. S. Hardinge, Esq., P. S. to the Right Hon'ble the Governor General.

Manuckjee Rustomjee, Esq.

And the following new member proposed:

Lieutenant D. Briggs, B. N. I., proposed by R. W. Frith, Esq. seconded by H. Torrens, Esq.

Capt. Marshall objected to the irregularity of the meetings. He was answered by the Sccretary, that for the last day of meeting there was nothing to be done, and that it was postponed by order of the Senior Vice-President. Capt. Marshall said at all times there might be matter for a meeting, and objected, generally, to the omission of a night of meeting; did not think that such irregularity did good to the Society, and further proposed a resolution bearing upon the points agitated by him, which it was decided, after some discussion, would better be circulated to resident members as notice of an intended motion to be brought forward and fully discussed at the next regular night of meeting.

Capt. Marshall acceded to this suggestion and the Secretary received instructions accordingly.

Read the following list of books presented and purchased since the last meeting:

List of Books received for the Meeting of the Asiatic Society of Bengal, Friday, the 3rd October, 1845.

#### Presented.

Meteorological Register for July and August, 1845, from the Surveyor General's Office.

Calcutta Christian Observer for September, 1845.—By the Editors.

Oriental Christian Spectator, for August and September, 1845 .- By the Editor.



Proceedings of the Geological Society of London, 1843-44, No. 99, vol. IV.—By the Society.

London, Edinburgh and Dublin Philosophical Magazine, No. 173, for April, 1845.— By the Editor.

Journal of the Royal Geographical Society of London, vol. 13, Part II. 1843.—By the Society.

Bullétin de la Société de Géographie, Troisième Série, Tome I. Paris, 1844.—By the Society.

Jahrbücher der Literatur, 1844, Nos. 105 to 108, 4 vol.—By J. v. Hammer-Purgstall.

La Rhetorique des Nations Moosulmans, Traduite du Persan par G. de Tussy. Paris, 1844, 2 copies.—By the Translator.

Natural History, Diseases, &c. of the Aborigines of Brazil, translated from the German of Dr. v. Martius, by J. Macpherson, Calcutta, 1835.—By the Translator.

Transactions of the Irish Academy, vol. 20, Dublin, 1845.—By the Society.

Arabic Syntax, by H. B. Beresford, London, 1843.-By the Author.

Note on the Historical Results from the Discoveries in Affghanistan, by H. T. Prinsep.—By the Author—2 copies.

Zeitwarte des Gebets, Arabisch und Deutsch, von J. v. Hammer-Purgstall. Wien, 1844.—By the Author.

Map of India, 1845 .- By the Hon'ble W. W. Bird.

Grammar of the Language of Burmah, by T. Latter, 1845.—By the Author.

Selection of Papers from the Records of the East India House, 4 vols.—By H. Torrens, Esq.

India House Papers-Marquess of Hastings, 1 vol.-By H. Torrens, Esq.

Presented by His Imperial Majesty the Emperor of Russia.

Tibetisch Deutsches Wörterbuch, von J. J. Schmidt. St, Petersburg, 1841, 1 vol.

Grammatik der Tibetischen Sprache, von J. J. Schmidt. St. Petersburg, 1843, 1 vol.

Der Weise und der Thor, Tibetisch und Deutsch, von J. J. Schmidt, St. Petersburg, 1843, 1 vol.

Mongolisch-Deutch-Russisches Wörterbuch, von J. J. Schmidt, St Petersburg, 1835, 1 vol.

Grammatik der Mongolischen Sprache, von J. J. Schmidt. St. Petersburg 1831, 1 vol.

Die Thaten des Bogda Gesser Chans, aus dem Mongolischen übersetzt, von J. J. Schmidt. St. Petersburg, 1839, 1 vol.

Ch. M. Fraehnii recensio numorum Muhammedanorum, Petropoli, 1826, 1 vol.

Jbn. Foszlan's und anderer Berichte über die Russen älterer Zeit. Text und Ubersetzung, von C. M. Frähn, St. Petersburg, 1823, 1 vol.

Die Münzen der Chane vom Ulus Dschutschi's, von Th. M. Frähn. St. Petersburg, 1832, 1 vol.

Sammlungen historischer Nachrichten uber die Mongolischen Völkerschaften, durch P. S. Palas. Petersburg, 1776—1801, 2 vols.

Archiv fur Asiatische Litteratur, Geschichte and Sprachkunde, von J. v. Klaproth, Erster Band. St. Petersburg, 1810, 1 vol.

Catalogue de la bibliothéque d'Edchmiadzin, par M. Brosset. St. Petersburg, P.



## Oct. 1845.] Proceedings of the Asiatic Society.

Arithmetik (in Georgian) by A. Ponofa. Kasan, 1837, 1 vol.

Monographie des Monnaies Armeniennes, par M. Brosset. St. Petersburg, 1839.

Dictionnaire Géorgien-Russe-Français, par D. Tchoubinof. St. Petersburg, 1840, 1 vol.

Déscription Géographique de la Géorgie par C. Tsarevitch Wakhoucht, publiée par M. Brosset. St. Petersburg, 1842, 1 vol.

Podcoigi Jspolunago Zaslygh Geror, etc. par R. J. Chimdta. St. Petersburg, 1836, 1 vol.

Sahb Jshi Jsinle ili Tnoecklin par Kitichimli, Tikstomb. St. Petersburg, 1839, 1 vol.
Assseb-o-Ssseirb ili Semb Planet, etc. par Seiida Mykhammeda Rishi, Kasan, 1832
1 vol.

Kitaiskar Grammatika, Petersburg, 1838, 1 vol.

Mongolbscae Khrestomatie, par O Cobalibseimh, Kasan, 1836-37, 2 vols.

Sogranie, etc. Mongolbscii Beybien, etc. Kasan, 1841, 1 vol.

Grammatika Tyreiko, Tatarchago Kasan, 1839, 1 vol.

Armeno Pyssei Slowarg, Moskwa, 1838, 2 vols.

Persidehae Khrestomatie, Moskwa, 1832-34, 3 vols. in 2.

Mongolbscae Khrestomatie, Kasan, 1836, 2 vols. in 1.

#### Presented by His Majesty the King of Holland.

Museum Anatomicum Academiae Lugdunae Batavae, descriptum ab Edward et Gerhard Sandifort, Lugdunae, 1793—1835, Fol. 4 vols.

Verhandelingen over de Natuurlijke Geschiedenis der Nederlandsche overzeesche Bezittengen, Uitgegeven door J. C. Temminck, 1 vol.

Tabulae craniorum diversarum nationum. Ed. G. Standifort, Lugduni Batav. 1838 to 1843, fol.

Historia Jemanae sub Hasano Pascha, Ed. Ant Rutgers, Lugduni, Bat. 1838, 1 vol.

De Expugnatione Memphidis et Alexandriae liber, vulgo adscriptus Abou Abdallae, Mohummedi Omari filio. Textum Arabicum ed. H. A. Hamaker, Lugduni Bat. 1825, 1 vol.

Abul Abassi Amedis, Tulonidarum primi, vita etres gestae, Auth. F. Roorda. Lugdun; Bat. 1825, 1 vol.

Specimen Criticum, exhibens locos Ibn Khacanis de Ibn Zeidouno. Ed et. Lat. vert. H. Engelin. Weijers. Lugd. Bat. 1831, 1 vol.

Nieve Proeve om de Arabische Letters door het gewoon Europeesch Karakter onderscheidenlijk uit te drukken. Voorgesteld door H. E. Weijers, Leyden, 1840, 1 vol.

Specimen e litteris Orientalibus, exhibens majorem partem Libri As—Sojutii, de nominibus relativis inscripti, Arab. ed. P. J. Veth, Lugd. Bat. 1842, I vol.

Pars reliqua Libri As-Sojutii, etc. Ed. P. J. Veth, Lugd. Bat. 1842, 1 vol.

Specimen e litteris Orientalibus, exhibens diversorum scriptorum locos de regia Aphtasidarum familia, Ed and Lat. vert. M. Hoogoliet, Lug. Bat. 1839, 1 vol.

Sojutii Liber di interpretibus Korani. Arab. Ed. A. Meursinge, Lugd. Bat. 1839, 1 vol. Taalibii Syntagma dictorum brevium et acutorum, Arab, Ed. and Lat. vert J. J. P. Valeton, Lug. Bat. 1844, 1 vol.

#### Books Exchanged.

Journal Asiatique, 4me Série, Tome III., IV. Nos. 19 and 20, Tome 5th, No. 21. Calcutta Journal of Natural History, No. 22, July, 1845.



Athenaum for June 21st, July 5th, 12th, 19th, 26th, and August 2nd, 1845.

The Asiatic Journal and Monthly Miscellany, No. 24, April 1845, 3rd Series, vol. 4th. The Edinburgh New Philosophical Journal.—By Professor Jameson, January to April, 1845.

#### Books Purchased.

Journal des Savants, January to March, 1845.

Classical Museum, No. 8, July, 1845.

Annals and Magazine of Natural History, vol. 15th, No. 101, Supplementary number.

New Cratylus .- By J. W. Denaldson, Cambridge, 1839, 1 vol.

Travels in Kashmir and in the Punjab.—By Ch. v. Higel, London, 1845, 1 vol.

Description of Hindoostan .- By W. Hamilton, London, 1820, 2 vols.

Voyage from England to India .- By E. Ives, London, 1773, 1 vol.

Memoir on the Mahrattas.-By V. Blacker, London, 1821, 1 vol.

Read extract of a letter from the Rev. J. Moore, Agra, as follows :-

I could then be more bold and make larger indents on you.

I shall send your Sanscrit list in a day or two, with such additions as I can glean here."

The Secretary was directed to enquire to what amount Mr. Moore hoped to be able to dispose of the Society's publications, expressing at the same time its wish to afford him every assistance in so doing.

Read letter from B. C. Colvin, Esq., Officiating Register, Sudder Dewanny Adawlut, as follows:—

#### No. 1215.

To the Secretary to the Asiatic Society.

Nizamut Adawlut, Present : J. F. M. Reid, Esq. Judge.

SIR,—I am directed by the Court to transmit to you two Copies of a Report of a trial for Rebellion held at Maulmain, and the painting and images therein alluded to, for the purpose of being deposited in the Museum of the Asiatic Society, if deemed fit objects by the Committee of Papers.

B. C. COLVIN, Officiating Register.

Fort William, the 12th September, 1845.

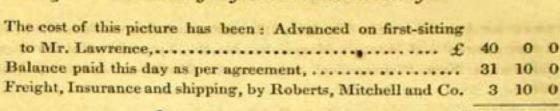
Ordered that, with the best thanks of the Society for this highly curious communication, the painting be placed in the Museum, and the Report printed in the Journal.

Read the following letter from W. Prinsep, Esq. relative to the pic-

ture of Mr. Thoby Prinsep.

H. Tornens, Esq. Secretary to the Asiatic Society, Calcutta.

My DEAR TORRENS,—My absence from London, Sir Edward Ryan's engagements, and other things have prevented my being able earlier to inform you of the completion of Sir Edward Ryan's picture for the Society. It is now however being packed for shipment and my friend Henderson will advise you when and how it is forwarded to you.



Thoby and I drew upon you before for £100 on account of the two pictures, Sir E. Ryan's and his own. We now draw for £35 at 1s. 9d. (or Co.'s Rs. 400)—to meet the above sum, which we pray you to honor in favor of Roberts, Mitchell and Co., and the remainder will be drawn as soon as Mr. Say shall have finished the picture of my brother, but here I am sorry to say we have been delayed by the severe illness of the painter, who has all this season been unable to proceed with his work. He has very nearly finished the likeness which is admirable, but the remainder has a good deal to be done to it. I am however in hopes that the painter, who is now recovering in the country, will before the end of the year be able to complete the picture, which I am sure will give your Society great satisfaction—to whom, I beg you will explain that it has been from no neglect on the part of your delegates that you have not sooner received the pictures which were ordered.

W. PRINSEP.

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### Read the following correspondence :-

To H. Tonnens, Esq. Secretary to the Asiatic Society.

SIR,—I have received from Lord Derby a quantity of wiring to set up as an aviary, wherein his lordship wishes me to take charge of any Pheasants, &c. which his correspondent may send up from the hills, or which I may be able to procure for him until I can get them shipped. And I write now to ask whether it would be agreeable to have the same set up in the Society's compound in place of the bamboo erection which is there at present. In granting permission it would be as well, for form's sake to acknowledge the aviary as belonging to Lord Derby, and not to the Society, in case his lordship might over wish to have it removed, which however is not very likely. To the Society, its being built on the premises would often be very convenient.

Your's respectfully,

E. BLYTH.

September 12th, 1845.

Note.

I have to submit the accompanying proposal to the Society:

A handsome aviary put up free of cost would be an object for us to secure. How far, under existing circumstances, we should be right in countenancing Mr. Blyth, who already complains of having much too much to do, in becoming the collecting Agent of an English Ornithologist is a question to be considered.

H. Torrens,

Vice-President and Secretary, Asiatic Society.

September 13th, 1845.

To E. BLYTH, Esq.

SIR,-I have the honor to acknowledge the receipt of your letter under date the 12th instant, relative to the construction of an aviary on the Society's premises.

2. In reply I have to state, that under all the circumstances of the case, the proposal made by you in behalf of Lord Derby is acceded to.



- 3. You are requested to submit a note of the probable size of the aviary, and to consult with the Secretary as to the site, which may be perhaps so selected as to make the object on ornamental and attractive one on the premises. It is of course understood that the aviary remains a fixture pending communication with the party at whose cost it is erected.
- 4. The charge of the birds on account of Lord Derby is a duty which the Committee conclude will in no way interfere with your professional pursuits on the Society's account.

H. T.

The proposal was generally approved, and the Secretary was requested to superintend the erection of the intended structure, in communication with Lord Derby on the subject.

Read the following letter from the Asiatic Society of Ceylon :-

The Secretary of the Asiatic Society of Bengal.

Sin,—I am directed by the Asiatic Society of Ceylon to order for their use the Journal of the Asiatic Society of Bengal. On your sending me an account of the annual subscription an order for the amount shall be sent, in the mean time you will perhaps oblige the Society by sending a copy of the last addressed to me.

WM. KNIGHTON, Honorary Secretary.

Colombo, August 18th, 1845.

Resolved that the Secretary be desired to express the gratification of the Society at the prospect of an intercourse with that of Ceylon, and to request its acceptance of as complete a set of the Society's Researches and Journal as can be now procured, free of expense, and that the same be regularly forwarded to it in future.

Read the following letter from the Baron Von Hammer Purgstall :-

SIR,—I have the honour of transmitting by your channel to the Asiatic Society, the set of the Vienna Review of the last year, together with a small Arabic prayer-book of mine, and to be with the highest regard,

Sir, Your's most humble, most obedient servant,

J. HAMMER PURGSTALL.

Vienna, the 8th of February, 1845.

The beautiful translation of the Arabic Book of Prayer was much admired, and the Secretary was desired, specially, to express the best thanks of the Society for this valuable addition to its library.

Read the following letter of the Chief Librarian to the King of Prussia:—

To the Honorable the Vice-President and Secretary of the Asiatic Society of Bengal, Sin,—Having received through His Excellency Dr. Eichhorn, His Majesty's Minister of Public Instruction, a copy of the standard works in and upon the Arabic, Sanscrit and Thibetan language, published by or deposited for sale with the Royal Society of Bengal, and sent to His Excellency, with your letter dated September, 1843. I feel it an incum-



bent duty to address you, Sir, begging to accept my best thanks for your kind mediation in forwarding the valuable gift to Berlin, and to oblige me by expressing to the Royal Society, my sense of deep gratification at the reception of a present for the Royal Library, which proves doubly valuable at a moment when the study of Eastern lauguages and literatures in Berlin is taking a new development by the acquisition of the whole manuscript collection of the late Sir Robert Chambers, which from His Royal Majesty's munificent donation has been incorporated into the institution under my care.

The Royal Library having hitherto not been in possession of any volume of the Ináya, and now received only the volumes 2, 3, and 4, I should feel exceedingly thankful, if by your kind interference the first volume was to be added to the gift of the Royal Society, or perhaps could be procured at our expense, in which case I should be happy to get, if possible, also the 17th volume of the Transactions of the Royal Society, the only which we have hitherto be n unable to procure, and the volumes 1—7 of the Journal of the Asiatic Society; the Royal Library being in possession of the Asiatic Researches, T. 1—16, 18—20 (P. 1, 2,) and the Journal, New Series, T. 8—11, (P. 1, 2.) Mr. Wattenbach of the house of Huschke, Wattenbach, and Co. at Calcutta, would on account of the Royal Library willingly repay the expenses incurred by you.

His Excellency intends writing himself in order to thank you for the gift, which has been disposed of in favour of our institution and of the Library of the University at Halle, and proposes to send you as a proof of his sense of gratitude, several works published by order and under the auspices of Government, viz. the complete edition of Aristoteles by Benker, and the Thesaurus Inscriptionum by Boeckh. As member of the Royal Academy of Science, whose library is distinct from the Royal Library, I may add, that we should be happy to present you also with a copy of our Transactions from 1825 to 1843, 25 vols, in 4to, if you would like to receive them; and perhaps the Asiatic Society would agree to a continual exchange of their Transactions, the library of the Royal Academy being hitherto not in possession of any of them.

I have the honor to be, with the highest consideration,

Sir, Your obedient servant,

DR. PERTZ.

Chief Librarian of His Majesty and Counsellor of Government.

Berlin, 10th June, 1845.

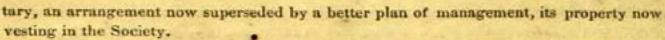
#### REPLY.

To His PRUSSIAN MAJESTY'S CHIEF LIBRARIAN.

Sir,—I am charged to express to you the high satisfaction of the Asiatic Society of Bengal at finding that their Oriental publications have been so acceptable to the excellent Institution at the head of which you preside, and that His Majesty has been pleased to direct His Ex. Dr. Eichhorn to take an occasion of acknowledging them.

I shall have pleasure in procuring if possible, and forwarding free of cost, the 1st Vol. of the Inaya. The 17th Vol. of our Transactions, I am directed to take an early opportunity of sending to you from the Asiatic Society of Bengal.

The early numbers of the Society's Journal will, I fear, be procured with difficulty, and as they are the property of myself in succession to my lamented predecessor, James Prinsep, not I am afraid without my being compelled to draw on Huschke, Wattenbech, and Co. for their cost. This is owing to the Journal having been up to the commencement of the year 1843 published as the property, and at the risk of the Society's Secre-



I am directed to acknowledge with the expression of our sincere gratification the pro-Bekker's Arist. mised donation as per margin, and to state that the Society thank-Boerkh's Ther. Inst. fully avails itself of the offer to supply from your Royal Academy of Science, the Transactions from 1825 to 1843, and will gladly continue to interchange its own transactions for them in future.

I take this occasion of stating that you will, I trust, receive by the beginning of next Istallahat-i-Soofeea, Ed. year, one or two of the latest Oriental publications as per margin. The Society will also despatch when complete a Sanscrit Anthologo. Asi. Ben. gy now in the press, edited by Dr. Hæberlin, one of its members. The second volume of the Naishada, which will make that work perfect, will be our next undertaking, and will I hope shortly be commenced on.

I have, with the expression of my high respect and consideration, the honour to subscribe myself, &c.

H. TORRENS.

## Read the following letter :-

To the Secretary of the Asiatic Seciety, Calcutta.

Sir,—In forwarding No. VIII. of our Journal for the acceptance of the Bengal Asiatic Society, may I request you will do me the favor of submitting to the Committee of your Society the enclosed Prospectus of our Journal, which will in future be published by subscription, and not from the funds of our Society as heretofore. In intimating this may I further request your good offices in obtaining on your side of India subscriptions to the work; which will be forwarded per Banghy to any part of Bengal. I shall feel extremely obliged if you will have the kindness to send back the subscription list at your carliest convenience.

James Bird.

Secretary.

Bombay Branch Royal Asiatic Society, 28th July, 1845.

Ordered that the letter and Prospectus be printed in the Proceedings, as being the best assistance which the Society can give, and that names of subscribers be received by the Society for the Bombay A. S.

#### PROSPECTUS.

Quarterly Journal of the Bombay Branch Royal Asiatic Society, edited by the Secretary. The Committee of the Society, appointed at the Meeting of the 12th December last, to audit the accounts and for other financial objects having reported that the expenses of the Quarterly Journal can be no longer debited to the current Income of the Society, but must be liquidated from special subscriptions to this individual object; the Secretary begs leave to intimate his willingness to carry on this publication under the auspices of the Society, provided nearly sufficient subscriptions, among the Resident, Non-Resident Members of the Society and others, are obtainable for defraying the expenses of publication. Situated so favourably as we are in Western India, for investigating and illustrating peculiar and particular objects of research relative to Hindu Mythology, Philology, and History, we are in possession of exclusive advantages for acquiring novel and useful information on the Ethnography of the various Asiatic races and regarding the Geography



and Natural History of the neighbouring countries; and on the Palaography and Arts of their inhabitants; placed as we find ourselves between Arabia, Persia, and Tartary on the one hand, and Egypt, Ethiopia, and Africa on the other. With such advantages of locality it seems incumbent on us and the Society to diffuse and make known that information, (on various subjects of Oriental Research,) which many, the Editor has found, are willing to collect and communicate. No exertion of his shall be spared to make the Journal as extensively useful and interesting, on all subjects, as the advantages of the locality naturally promise; and he is sanguine, from the assistance hitherto given, that the exertions of contributors will rather increase than diminish. The size of each number will be generally about a hundred octavo pages with Lithographs: for which it is proposed to charge Rupees 2 to Members of the Society, and Rupees 2-8 to Subscribers not Members. The following are the contents of the October Number, now nearly ready for issue from the Press. 1st. Two ancient Inscriptions in the Cave character and Sanscrit language translated into English. 2nd. An account of the temple of Somnath, and translation of a Sanscrit Inscription found there. 3rd. The late Mr. Prinsep's correspondence relative to Indian Antiquities. 4th, Hamaiyaric Inscriptions from Aden and Saba translated into English. 5th. Geological observations on the alluvial soil of Sindh, and hills in the neighbourhood of Hyderabad. 6th. Observations on the Runic Stones of Scotland. 7th. Notice on Hindu gold coins found in the Southern Konkan, and on the gold Zodiac coins of the Emperor Jehangir. 8th. On the origin of the Hamaiyaric and Ethiopic Alphabets. 9th. Analysis of a work, entitled Historical Researches on the origin and classes of the several Cave temples of Western India. Literary and Scientific notices. 11th. Proceedings of the Society.

At the January Monthly Meeting of the Society, the following gentlemen subscribed their names to the continuation of the Journal: and such Resident Members of the Society as are disposed to support it will favor me with their names and address.

James Bind, Secretary.

Bombay Branch Royal Asiatic Society's Rooms, 23rd June, 1845.

Read the following letter from the Geological Society of London:-

To H. Tornens, Esq.

Sir,—In reply to your application respecting certain missing numbers of the Proceedings of the Geological Society, I am requested by the President and Council of the Society to inform you, that they have much pleasure in directing that those numbers should be forwarded to the Asiatic Society of Bengal immediately, and without any charge.

I am also instructed to express through you the thanks of the President and Council for the donation of the Researches of the Asiatic Society of Bengal, which they have received from that Society.

WILLIAM HAMILTON.

Geological Society, Somerset House, April 5th, 1845.

The Map of India presented by the Society's late President the Honourable W. W. Bird, was exhibited and directed to be placed in the Library.



Read the following note from the Baron des Granges, accompanying the presentation referred to :-

To the Secretary of the Asiatic Society.

Baron des Granges humbly presents to the Secretary of the Asiatic Society, a few specimens of his first crop of Nutmegs in his Plantation at Mergui—which Nuts become more remarkable, as they are not only the first raised, and in so high a latitude as Mergui, but because they will be under the circumstances, also the last grown at Mergui, at least in the Baron's Plantation.

Calcutta, 9th August, 1845.

Read the following letter from James F. Corcoran, Esq. :-

To H. Torrens, Esq., &c. &c. &c.

Dear Sir,—I have been advised by persons who know best about these matters, to defer the publication of the Guldastáe Ishk until the public are somewhat more acquainted with me; because as that book is a mere collection of tales, and is high-priced besides, I should not get sufficient subscribers for it until people know what ability I possess to get creditably through such a work. I have, therefore, determined on first publishing the little book of translation, (whose Prospectus I beg herewith to send,) in order that as the price is low and the original in universal estimation, there may be a chance of its selling well and of paving the way for the more voluminous Guldastáe Ishk-which would then be viewed with some respect; as a stranger, with whom, though personally unacquainted, yet of whose merits we have heard enough to give him a warm welcome.

I entertain great hopes that your patronage will be extended to me, and if, through your influence, the Asiatic Society would condescend to honor me with theirs, my little work would glide glibly into existence.

JAMES CORCORAN.

Calcutta, 23rd June, 1845.

Ordered that the Society subscribe for ten copies of the work, and that it do afford Mr. Corcoran the advantage of making his work better known by printing the advertisement and specimens in the Proceedings.

They are as follows:—

Advertisement of a new Translation of Esop's Fables, into the Urdu Language, by Mr. James Francis Corcoran. Respectfully dedicated to Robert Haldane Rattray, Esquire, B. C. S. Judge of the Sudder Nizamut and Diwani Adalat.

The Grecian Fabulist has for some years been before the Public in a Hindústaní dress; and some explanation may therefore be deemed necessary, as an apology for the present repetition. I presume not to say that the translation now offered is better than the one we have: this the Public must decide. I may, however, exhibit those pretensions to their patronage which I imagine to be mine; and this done, I will patiently await their judgment.

In the present version I have endeavoured, first, to render the Urdú more colloquial and spirited than it is in the old translation; and, secondly, the moral of each fable has



been attempted in poetry, with the view of enabling the reader to remember its application to the occurrences of life.

The Persian Lokman said, that he had learned good breeding from the vulgar, by never imitating their actions. In like manner I owe an acknowledgment to the former translator; since the rock he struck upon has warned me to shape my course, as I hope, more successfully. He has failed by too rigid an adherence to literal translation; the respective idioms of Urdú and English so materially differ, that what is witty and energetic in the one language, literally rendered in the other becomes dull and vapid. A pardonable licence has accordingly been taken, whenever the genius of the original or the turn of the dialogue appeared to require it. I have not, however, indulged in too many liberties with my author; bearing in mind that "between freedom and impertinence there is but a step."

Occasionally, a trifling addition has been made to the moral of the fable; with an attempt to avoid sameness, by exhibiting the sentiment, sometimes in lively, sometimes in serious, verse.

It is proposed to print at present, Part 1st of the Translation, comprising 50 Fables, and during the next quarter of the year, "Part 2nd," provided the humble Translator be honored and encouraged by the extension of a remunerating patronage.

# اشتی \_\_\_ار

یونان کے طبقے میں ایک شخص حکیم مذش تھا جسکا نام اسپ مشہور ھی اور جسکی تصنیف لڑکے سے بوتھ تک سب کو پسند ھی اور آسکا ترجمہ سب زبانوں میں ھوا ھی چنانچہ آردو زبان میں بھی نہایت مشہور ھی اگرچہ اِس کتاب کا ترجمہ آردومیں جاری ھی مگر عاصی جمس کارکن نے دو بارہ اسکے ترجمہ پر اُس بزرگ کی خواھش اور ارشان سے کمر باندھی ھی جسکے علم اور فضل کے باران فیض سے باغ انشا پردازی کا شاداب اور زمین شعر گوئی کی سیراب ھی چونکہ بندے کو معلوم نہ تھا کہ سخن کے بازار میں اس انمول جواھر کے کتنے خریدار تھہرینگے اس جہت سے فقط پچاس نقلوں کا ترجمہ بالفعل چپچ گا اور آیندہ بندے انشاءاللہ تعالی اگر زندگی باقی رھی اور لوگوں نے قدردانی کی افساءاللہ تعالی اگر زندگی باقی وہی اور لوگوں نے قدردانی کی افساءاللہ تعالی اگر زندگی باقی وہی اور لوگوں نے قدردانی کی بطور نمونہ کے اس اشتہار کے ساتھہ چپچی ھی ۔ ۔ ۔ قیمت بطور نمونہ کے اس اشتہار کے ساتھہ چپچی ھی ۔ ۔ ۔ قیمت

هرجلد کي دوروپيه ، جن صاحبون کو اس کتاب کے لينے کي خواهش هو اُنہيں چاهئے که مهرباني کي راه سے اپذا نام و نشان يا جای سکونت اسکے ساته جو سادي کتاب هي اُسمين مندرج کر ديوين فقط

SPECIMEN OF TRANSLATION.

Fable of the Lion and the Clouse.

شیر اور چو ھے کی نقل

ایک دفعه کسی شیر کے پنجوں تلے ایاک چوها آگیا اور شیر نے آسے ماردالنے کا قصد کیا مگر جب آس بیچارے نے بہت آلا و زاری مے اپنی جان بخشی چاهی شیر نے آسے رهائی دی چند روز کے بعد انقلاب روزگار سے ایسا هوا که وهی شیر ایک شکاری کے دام میں آگیا لیکن جنب آس چوهے کو یہه وحشت ناگ خبر ملی آسنے اپنے محسن کی مدد کی اور بات کے کہتے جال کو کترا اور شیر کو خلاص کر دیا فقط

## حاصل

بتایا هی گرتجهکوحق نے امیر \* \* ندیکهه اِن غریبون کو هرگزحقین خبراپنی گردشکی بهی هی کهیں \* \* که ایك حال پر کوئی رهتانهیں کیا جسنے رحم آسنے پایا هی رحم \* \* خدا آسکاهی جسنے کهایا هی رحم

Read the following Memorandum from the Sub-Secretary :-

#### MEMORANDUM.

Extract from a letter from Dr. Sprenger to the Sub-Secretary.

I have found a copy of the book which I have published on Sufiism here and see the edition is very correct. The Society would do me a favour if it would send some copies to Europe for sale to the Asiatic Society at Paris, and to Mr. Norris or Mr. Neal, clerks to the Asiatic Society in London, requesting them to send the same to Brockhaus at Leipsic and other places with the books of the Oriental translation committee, in order to render the publication known.

The Secretary notes with reference to this Memorandum, that Dr. Sprenger's suggestions have already been acted upon.

### Oct. 1845.]

Read the following letters from the late Major Leech and R. C. Cust, Esq., B. C. S.

To H. Torrens, Esq. Secretary, Asiatic Society.

My DEAR SIR,—I have the pleasure to inform you that I will despatch by baughy dawk to-day or to-morrow, for presentation to the Asiatic Society, three other MSS, relating to the History of the Afghans, and a History of Herat, with the commencement of our Abstract of the same.

It had been my intention with the above materials and those already in the possession of the Society (History of the early Abdalees) and with the History of Ahmud Shah Duranee forwarded yesterday, to have compiled a History, but I have not hitherto had, nor do I see any prospect of my ever having the requisite leisure.

An accident moreover that my small library met with (vide the damaged state of the MSS.) a few months ago, has determined me to lose no time in placing the valuable MSS. in a safe place.

The Society are of course at liberty to put them at the disposal of any person having more leisure than myself to extract what is interesting in them.

R. LEECH,

Ist A. G. G. A., N. W. P.

Umbalah, 7th August, 1845.

To H. TORRENS, Esq.

My DEAR SIR,—I have the pleasure to inform you that I will to-day or to-morrow transmit by banghy dawk, for presentation to the Asiatic Society, the History of Ahmad. Shah Duranee, in Persian, accompanied by an abstract of the same. I have every reason to believe that the work is a scarce one. It was procured by me after several years' search in Afghanistan. The original (the one from which this is a copy) is in the possession of one of the Princes at Peshawar.

R. LEECH, 1st A. G. G. A., N. W. P.

Umbalah, 5th August, 1845.

To H. Torrens, Esq.

My DEAR SIR,—Among the papers upon the table of my lamented friend Major Leech, I found when taking charge of his office at Umbalah a letter from yourself, dated the 20th ultimo, open, but unanswered, conveying to him the thanks of the Asiatic Society for his map of the Kurukhetra. He received it a few days before he died, and one of his last acts was giving instructions to his Pandit and Mapper, with regard to the comple tion of the interesting work, which he had in part forwarded to you. In this part of the world we have much to regret his loss, and his papers shew the number of scientifiand curious researches in which his active mind was unceasingly employed, of the results of which the Journal of the Asiatic Society has more than one specimen. Some of the works which he forwarded to Govt. have not yet seen the light. I trust that they may (especially a contribution upon the subject of the Sikh religion) some day be published.

It appears from your letter about the Kurukhetra that you are in the belief that the whole of the narrative to accompany the map has been forwarded to you :—if I am not in error, a great portion is still unfinished, but I have directed the Pundit employed to proceed in his works, and if you desire it I will forward it to you. I have been aware of Major

Leech's interesting project from the first day that it was started by him, and I trust therefore that I shall be able to assist you to whatever may appear necessary to complete it. I am having a copy of the map made in the Persian character, - and I should suggest also having a translation of the narrative also made in the Persian language, as after all Sanskrit is a language known only to few, and the Maha Bharata itself is better known in its Persian translation, I suspect, than in the original : at any rate publishing the map and pamphlet in Persian, would greatly extend the publicity of the work, though I am afraid it would entail a considerable additional expense on the Society. I am having a copy also of the map prepared in Goormukhee, the sacred character of the Sikhs; and here a question is started whether a work should not be struck off in that character also. The whole of the Kurukhetra is included in the territory of the Sikhs-the chiefs who now possess the country, except those parts which have lapsed to us, know-and read no other character, and one of Major Leech's objects was to present to each chief a copy of the map, if possible one of an ornamented kind (perhaps in gold letters on parchment)-of course the value would to them be increased if they could read the names on the map, and understand the words of the account, which they certainly would not do in Persian or Sanskrit. It would be a desirable result if these chiefs could be prevailed upon in return for the compliment of the map to subscribe towards establishing an efficient college for the study of Sanskrit and Goormukhee at Ghanesun, a holy place within the limits of the Kurukhetra. We have an inefficient college for Sanskrit at Umbalah, but on a very limited scale. Do you think the Society would object to making a donation to the Pundit, who has been zealously employed in this work for six months? Major Leech's sudden death has of course left the accounts of all the parties employed unsettled. I feel too happy to take upon myself all charges connected with so interesting an undertaking, but the Pundit with a natural pride in his work seemed anxious for some acknowledgment from the higher powers. I therefore take the liberty of bringing it to your notice. the head of our Umbalah Sanskrit College.

> Robert Cust, Civil Service.

Simlah, 12th September, 1845.

The letters being read the Secretary begged leave to express to the Society the irreparable loss it has sustained in the death of Major Leech; a gentleman not less distinguished for his eminent services as a public officer than for his professional abilities and extensive knowledge of native languages, history, manners and customs; his untiring zeal and industry in researches connected with these subjects, and the noble liberality of mind with which he on so many occasions has communicated the fruits of his knowledge and labour for the public benefit from 1838, in which year his first contribution, A grammar of the Brahooee, Beloochee and Punjabee languages, adorned the pages of our Journal. Vol. VII. p. 780.

There is indeed too much reason to fear that, like the lamented James Prinsep and others, Major Leech has fallen a victim to excessive mental labour; adding another to the long catalogue of the truly noble men



who have perished in their exertions to forward, in common with the Asiatic Society, the high task and duty of every liberal, right-minded, and educated Englishman in this country—the task and the duty of aiding in every way to give to the British power in India, for the great ends which it has yet under Providence to accomplish, those means and that stability which can only be found and assured for it by the one great essential to the right exercise of the power of every foreign government—an intimate knowledge of the country and of the people over which it rules.

Read the following letter from Capt. Phayre, Bengal Native Infantry, Assistant to the Commissioner of Arracan.

My DEAR TORRENS,—I have just arrived here from Sandoway, and as Latter is here and I am anxious to have the advantage of comparing along with him all the various Arakanese coins, will you kindly put those you have of mine on a wax-cloth package, and send them by dawk banghy bearing postage to my address at this place. Latter is working away gloriously and will produce many a fine paper on Boodhism—he has made wonderful progress since I last saw him. The Society's Journal will, I hope, receive many contributions from him. Pray don't forget the coins, and believe me,

Very truly your's,
A. P. PHAYRE.

Akyab, Sept. 25th, 1845.

I know not if you recollect an English translation of a part of the *Dhammathat* you once sent to Major Williams down here; if you can forward it to me I can now compare it with an original I possess.

The Secretary noted with infinite regret that these coins had shared the fate of our collection, and he was requested to inform Capt. Phayre accordingly.

Read the following letter from the Zoological Curator :-

To H. Torrens, Esq. Vice-President and Secretary, Asiatic Society.

Sin,—Among the Rodentia of Captain Hutton's Afghanistan collection, is a small animal which I described long ago in the Society's Journal by the name Georhychus fuscocapellus, placing it thus among the Lemmings; but now that we have specimens of the true Scandinavian Lemming in the collection, I find that the Afghan species can no longer be admitted exactly into the same genus, and am under the necessity of establishing a new one for its reception.

Under these circumstances, I write to request that Mr. Hendrie be employed to figure this animal and its skull, as was done with the *Caprologus*, and that on the second or skullplate, I may also have represented certain crania of Scindian and Afghan Hedgehogs which it is desirable should be figured.

An extra copy of the last No. of the Journal has been forwarded to Major Jenkins, containing the figures and description of Caprologus; and with respect to the additional



wiring required for the aviary, I expect to able to furnish an estimate of the expense at the Society's forthcoming meeting.

Your's very respectfully,

E. BLYTH.

Asiatic Society's Museum, 1st Oct. 1845.

The proposed plates were sanctioned.

Read extract of a letter from J. Muir, Esq. C. S., transmitted by Messrs. Ostell and Co. as follows:—

There are among the Researches of the Asiatic Society of Bengal, two papers on the Religious Sects of the Hindus, by Professor H. H. Wilson, the first in the 16th vol. containing 136 pp. quarto, and the second I think in the 18th vol., but I have not the means of referring to it. I should feel obliged by your looking at both papers and informing me what it would cost to reprint both (1000 copies in octavo,) in a style similar to that in which the Journal of the Asiatic Society of Bengal is printed, as to type and paper. Of course the reprint could be only done by the Asiatic Society, or with its permission.

(Signed) J. Muin.

Azimgurh, Sept. 1st, 1845.

Resolved, that the Society will be most happy to allow the reprint of the papers as proposed, stipulating only that "Reprinted from the Researches of the Asiatic Society, vols. 16 and 17," appear on the title page.

Read the following letter from Capt. Latter, Bengal Native Infantry:-

To H. TORRENS, Esq.

My Dear Torres,—I send you according to promise, the remarks on the Booddhist sculpture sent some time since by me to the Society. As my paper is likely in some points to interest people in Europe—might I ask your kind attention to the accents, &c. of the Greek quotations and to the Hebrew which the compositors are likely to spoil. As also, that if possible the paper may not be divided. It is perhaps rather long—but I had so much to say on the subject, that I could scarcely make it shorter. Would you kindly let me have the full fifty copies (I only got thirty of the note on the coin). I propose to intitle the communication "The Boodhism of the Emblems of Architecture" or any other which you may think advisable. Phayre begs me to beg you to send him back the Burmese or rather Arracanese coins. He is very anxious about them, as he wants to make out a paper, which from what he says is likely to appear very interesting. I am afraid you will think the communication I now send rather singular—" Paul, a master Mason! "but I am thinking of inflicting on you a still more singular paper. On the Nine Sacred Jewels of Boodhism. I am only waiting till I can get from home Orpheus' hymn "Perilithon."

THOMAS LATTER.

The paper accompanying this was referred to the Editors of the Journal for early publication.



### Read the following letter from M. Lienard, of the Mauritius :-

Monsieun,—Mr. Thomy Hugon m'ayant dit qu'il vous serait agréable d'entretenir des relations avec Maurice, je viens sous ses auspices vous proposer un commerce d'échange d'objets d'Histoire naturelle.

Pour débuter, je remets à Mr. Hugon, que veut bien s'en charger, la tête et la caudale d'un Istiophore qui a été pris sur nos cotes. J'y joins une caisse de coquilles de Maurice et de Diego Garcia. Parmi celles de Diego vous trouverez une paire de houlettes que j'ai pêchées moi-même dans l'immense baie de cette île. Jusqu'ici on croyait que la mer Rouge seule recelait ces bivalves.

Je désire, Monsieur, que ce petit envoi vous soit agréable ; vous pouvez compter que je ferai tous mes efforts pour satisfaire à vos demandes et entretenir ainsi un commerce qui ne pourra qu'être avantageux à tous deux, et qui me sera particulierement agréable : Je serais flatté aussi d'entrer en correspondence avec la Société dont vous êtes membre.

Je suis un peu Zoologiste: C'est vous dire que tout ce que vous pourriez m'offrir en fait de mammifères, oiseaux, reptiles, poissons, mollusques, insectes, arachnides, crustacês, annilides et zoophytes, me ferait le plus grand plaisir: Je me bornerai pour le moment à vous designer spécialement un objet qui manque à mon musée. C'est un jeune Garial. J'ai des crécodiles de Java, de la cote Malabare, de Calcutta et de Madagascar.

Indiquez moi les objets de notre pays qui pourraient vous être agréables, Je m'empresserai de vos les procurer. Si vous desirez des poissons de mer et d'eau douce, nos cotes et nos rivières en fournissent une grande variété. Parmi ceux d'eau douce, nous avons L'osphronème, qui nous a été apporté de la Chine ainsi que la Dorade, plusieurs espèces d'Eleotees, de gobies, des doubles, des megalopes, des ambasses, des anguilles de deux espèces et le nestis connu vulgairement sous le nom de Chitte.

Si vous voulez bien m'envoyer des poissons du Gange et des étangs du Bengale, ayez l'obligeance de les mettre dans des vases avec de l'esprit de vin. Je vous renverrai les vases avec des poissons du pays.

Je remets pour vous à Mr. Hugon, une serie d'observations metéreologiques. Je pourrais vous envoyer celles que je fais chaque mois.

Recevez, Monsieur, l'assurance de mes sentimens distingues de consideration.

(Signé) LIENARD.

Mon adresse est

Mr. Lienard père, vice President de la Société d'Hist. Nat. de l'île Maurice. Rue de Castries, Port Louis.

The donations referred to have been subsequently received, and it was ordered that the Journal of the Society be sent to Mr. Lienard from the commencement of 1845, for the Société d'Histoire Naturelle.

The Zoological Curator was also requested to prepare a dispatch of such specimens and duplicates as could be obtained or spared, so as to meet as far as possible Mr. Lienard's wishes.

Read the following letter from P. J. Sarkies, Esq. :-

To HENRY TORRENS, Esq. Secretary to the Asiatic Society of India.

Sin,—A Society having been lately established here by the Armenian community for the diffusion of useful knowledge amongst their countrymen, called the "Araratian Society,



or Society of Ararat," I have the honor, by the desire of the members, to address you this letter, and to request the favor of your presenting gratis to them all the Journals of the Asiatic Society from its commencement, and to continue the same throughout, for which they shall feel highly obliged.

Our object in requesting this favor is to translate the useful productions they contain into the Armenian language, and publish them in our Society's Weekly Journal, the "Patriot," for the perusal and information of those of our countrymen, who are unacquainted with the English language, both here and at other places. The first number of the said publication, I beg leave to forward you herewith.

Trusting that this application will meet with the favorable consideration of yourself, and the members of your Society generally,

I remain, &c.

P. J. SARKI

Calcutta, 22nd August, 1845.

Secretary to the Society of Ararat.

Ordered that the Society of Ararat be presented with the Journal from January, 1845, and in future as published.

Read the following correspondence which was approved and ordered to be published.

To the Secretary of the Asiatic Society.

Sin,—I have the honor to submit through you, to the Committee of Papers, the appearance of a memorandum in the Society's Journal tending, in a most serious manner, to implicate my character and reputation in the eyes of my scientific co-labourers, as deliberately advising a measure which is stigmatized in that memorandum with the name of "scientific fraud."

The memorandum in question appeared in the Proceedings of the Society for October, 1844, published in the 154th number of the Journal; and the paragraph to which I would draw the particular attention of the Committee is No. 6 (misprinted as No. 5).

I freely admit that upon more than one occasion, when the subject of Burnes's drawings was mooted in conversation, and also I think once in an unofficial note to yourself, I objected to the extreme rudeness and inaccuracy of certain of those drawings, and recommended that if such had to be lithographed, it would be better to correct the outlines where these were obviously erroneous, by putting such joints and muscles into the limbs of mammalia as they must necessarily possess, and even improving the attitudes in some instances, especially as Burnes's own specimens supply materials for the purpose to a considerable extent:—but most assuredly I never proposed that such alterations should be made without due notice being taken of the same, and can only express my astonishment that it should have been thought necessary to place the matter before the world in the light in which it has appeared.

The purport of my non-official recommendation will be best understood if I adduce two or three instances; and these, to the best of my recollection, shall be the very instances to which my remarks (in conversation) referred.

1. The figure of the Hyena of Cabool (now lithographed) will, in my opinion, disgrace the Society's 'Researches,' if it appears in them: but as the animal is perfectly well known, I believe I recommended that a proper figure of a striped Hyena should be designed, and the markings filled up from the drawing supplied by Burnes.



- 2. The figure of the wild sheep of the Hindu Kosh ranges, though altogether faulty in outline, is such that a really good figure might be taken from it, aided by very careful drawings from life which I possess of a closely allied species, the Ovis musimon, and by the real horns of the animal, of which several pairs were in the collection of specimens forwarded by Sir Alexander Burnes, and (with the exception of duplicates transmitted to the Indiahouse, two pairs only being retained for the Society's collections) now under my charge in the museum.
- 3. To cite a bird, I remember instancing the Falco chicquera, of which the beak in Burnes's figure is very ill-shaped, and the legs and toes are very much too slender,—faults that, with others, might have been corrected (as in various other instances) by a reference to Burnes's own specimens. Had I been consulted in the matter, I should have done my utmost to dissuade the Society from expending money in the representation of this and many other common and exceedingly well known species, even had they been represented with the requisite accuracy.

But in suggesting the propriety of such alterations (whether rightly or not so in the opinion of the Committee), I do most distinctly protest against the imputed charge that I ever wished them to be effected privately, or in secret,—in other words, that I ever desired the Society should be guilty of a "breach of trust," which I also would have considered to amount to "a scientific fraud:" and it is due to other zoologists that, I should now interfere in their behalf, to notice an allegation contained in the same paragraph of the same memorandum to the following effect:—

"That the now anxious search of all European naturalists is exactly to find the original drawings from which local found Ornithæ had been published, in order to correct these flourishes, and interferences of authors and naturalists; who, to make better pictures and reduce the birds (principally) to their fancied types and systems, had in many instances created enormous confusion, deprived the original observers of their due credit for active research and accuracy, and had even made them pass, at least as careless persons, if not as impostors; when, on the contrary, the mischief and imposture was the work of the naturalist editors, publishers, and artists."

I believe, sir, that I have the credit, in well-informed quarters\* of a tolerably familiar acquaintance with zoological literature, but I beg to say that I cannot call to mind one single instance to which the above remarks apply.

The confusion adverted to has, on the contrary, originated in the blind confidence which Latham more particularly, and some other ornithologists of the old school, and of a past generation, reposed in the rude drawings of unscientific artists; so rude, and oftentimes grossly inaccurate, that it is only now that the subjects represented have come to be, for the most part, familiarly known, that they can be recognised in the figures which were intended to represent them,—and that the names subsequently applied to the objects themselves can be superceded by those bestowed on the drawings, and heading the descriptions taken from the latter, in conformity with the admitted law of priority. Of the fact here stated, I could easily adduce instances almost without number.

<sup>\*</sup> Vide ' Report of the British Association,' for 1844, p. 187.

<sup>†</sup> In illustration, I send herewith two numbers of the 'Annals and Magazine of Natural History,' containing papers by Mr. G. Gray and Mr. Strickland, wherein the confusion that has resulted from the very reprehensible practice of naming species from bad drawings is well exhibited.



Such being the case, I venture to hope that the Committee will perceive the justice of retracting the very sweeping charge against "naturalist editors, publishers, and artists" which has appeared in the Journal of the Society: and that it will also admit that the grievous animadversions complained of, having reference to myself, were not merely unnecessarily harsh, but were altogether uncalled for, as founded on a misapprehension of my meaning. At the least, I consider that it was due to me to have been formally asked whether my opinions on the subject were correctly expressed, before such a procedure was resorted to as that of publicly stigmatizing them in the Society's Journal.

ED. BLYTH.

Asiatic Society's Rooms, Fort William, Aug. 23, 1845.

Note to the foregoing by the Secretary.

In submitting this note the Secretary desires to remark that Mr. Blyth takes a most mistaken view of the paragraph in question; inasmuch as, on reading it attentively, it will be clearly seen that no proposal of perpetrating any scientific fraud is attributed to him, but it is simply said that if the Society admitted corrections, it would perpetrate a fraud, and the Committee will remark that it is now fully and clearly admitted by Mr. Blyth himself, that he did propose corrections of joints, muscles and attitudes. How far those corrections were to go, will appear from par. 1 of Mr. Blyth's paper in which he distinctly again avows,—asserting that "the Cabool Hyena is perfectly known," which assumes but one variety to exist, and that we have so perfect a knowledge of the zoology of Affghanistan, that we can be certain that there is only one variety; and farther that, only one variety exists in the whole valley of the Indus, which would include Scinde, (where Sir A. Burnes's drawings commence.) Asserting and assuming all this at once then, Mr. Blyth proposed, he himself says, to substitute "a proper figure and fill it up with the markings of the Cabool Hyena."

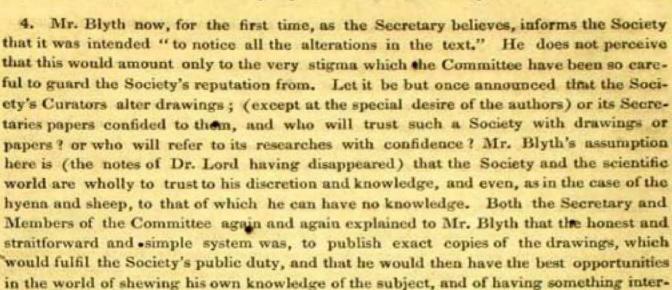
- 2. Par. 2 of Mr. Blyth's letter carries the matter still further. Pronouncing on an animal which none but travellers in the almost untrodden regions of the Hindu Kosh have seen, and Dr. Lord alone perhaps examined as a naturalist, we are told that by reference to certain drawings of "closely allied species," the horns, &c., a good figure can be taken from it; so that here is the manufacture of two entire animals distinctly proposed as a mere matter of course! The same style of argument is continued as to the birds which are also proposed to be "corrected" from stuffed specimens in the face of drawings made from the life.
- 3. The Secretary presumes that these paragraphs most fully justify the caution and strict observance of the principle upon which the Committee acted, and which the Society approved; of keeping to rigid and exact copying: and the Committee's expressions (used to explain that strictness) that " if the Society consented to any such alterations, it would be guilty of a scientific fraud, publishing as the drawings made on Sir A. Burnes's mission, pictures of something else, &c." We have before us now two distinct proposals for making pictures; one of which may yet be carried into effect, if the Society approve of it-

In Mr. Gray's paper, it will be observed that an owl (Athene convivens) came thus to be described by Latham as a Falcon! &c. &c. See No. for March 1843, p. 189.

Vide also Mr. Strickland's remarks in the May No., p. 334; though I could wish that he had reflected more severely upon the above mentioned extremely objectionable practice on the part of Latham.—E. B.

### Oct. 1845.] Proceedings of the Asiatic Society.

esting to say about, perhaps, a very uninteresting bird or animal.



5. The Secretary cannot also on this occasion refrain from adverting again to the attempt to undervalue Dr. Lord's labours, to the extent, nearly, of asserting that he knew nothing of Natural History, in Mr. Blyth's MSS, excuse for the disappearance of the notes formerly submitted to the Committee, and this specially, as he is now enabled, fortunately to shew what the notes may have been, and how ill-deserved any dyslogism applied to them must be. A friend has pointed out to him the following passage which occurs at the close of a very able paper entitled, "A Medical Memoir on the Plains of the Indus," in the Eighth Vol. of the Transactions of the Medical Society of Bengal, Appendix, No. 24, p. 81.

"Animals. Of the animals to be found in these regions, I shall at present say nothing. They must be looked on as rather influenced by, than exercising any influence on the Medical constitution of the country, which it is my more immediate object to illustrate. But I may be allowed to add that between specimens and drawings," I have already made some advances, as opportunities have allowed, towards a sketch of the Zoology of the plain of the Indus, which I hope at some future time to render so far complete as to be not unworthy of notice."

It will be seen from this that so far from being, as Mr. Blyth has put forward, "nearly ignorant of Zoology," Dr. Lord projected at least a Zoological Memoir.

The Secretary submits that so far from any blame attaching to the Committee (whose labours have already been approved by the meeting) the Society are greatly indebted to it for its steady opposition to this "correcting" system.

The Secretary does not conceive it necessary to remark on that part of Mr. Blyth's paper which enters into the defence of naturalist editors and artists generally, as being an accessary discussion, quite uncalled for, and which would introduce a precedent tending to check the free expression of opinions in Committees, and moreover, because he conceives that Mr. Blyth has himself, in the above quoted paragraphs, amply shown that, if allowed, he would himself have rendered (and if the Secretary understands his expressions with respect to the sheep correctly) would even now render reference to the original drawings

<sup>• &</sup>quot;I should acknowledge with thanks that several of these drawings which had been made previous to my joining the Mission, were immediately on my arrival placed altogether at my disposal by Captain Burnes."



indispensible; at least whenever they had been copied without the text explaining the corrections.\*

Mr. Blyth finally complains that the animadversions were harsh and published without reference to him. The Secretary has already stated that he wholly dissents from there being any animadversions at all conveyed or intended. The Committee for the Burnes's drawings felt themselves bound to give on this occasion a full and distinct history of the matter (see Report) to exculpate themselves from an apparent neglect of 7,000 Rupees worth of outlay under their charge, and he believes the feeling was, that the only possible motive which could be assigned for Mr. Blyth's open contempt of the Society's orders and wishes for three years, might be perhaps pique at not being allowed to alter the drawings, and thus that the Committee deemed it preper to enter fully on that question.

With respect to the non-reference to Mr. Blyth; what is alluded to in the memorandum is his proposal of correcting, which his present paper shews not to have been in the least overstated. The sequel is merely the statement of the Committee's grounds (acting for the Society) for rejecting that proposal, and Mr. Blyth himself gave rise to the publication of which he now complains by having been three years in default.

H. TORRENS,

September 3rd, 1845.

Vice-President and Secretary, Asiatic Society.
E. BLYTH, Esq.

SIR,—I am desired by the Committee of Papers of the Asiatic Society to acknowledge receipt of your letter of the 23rd August and to state in reply,—

That after an attentive consideration of it, the Committee have thought it right that it should be published in the Proceedings, as affording to the Society, and to the public in general, a full explanation of your views on the subject of the proposed corrections, and the knowledge that you by no means intended making these without a full account of them in the proposed text.

2. The Committee further desire me to state that they fully approve of the determination of the Committee for Sir Alexander Burnes's drawings to publish nothing as such, bearing the sanction of the Society's name, which were not exact copies of the originals as entrusted to it by Government.

Museum, 18th Sept. 1845.

I am, Sir,
Your's obediently,
H. Torress,

V. P. and Secy. As. Society.

Specimens of acorns and of fir cones from Darjeeling presented by —— Cockburn, Esq. were laid on the table.

The Curator of the Museum of Economic Geology and Geological and Minerological Departments had been unable, on account of illness, to prepare his report or to attend the Meeting.

The best thanks of the Society were voted for all the above presenta-

<sup>\*</sup> Refer also to the Note submitted at the former Meeting, in which the special instance of the hocks of the Elephant is adduced.



# श्रीश्रीदुर्गा ॥

# एसियाटिक् सोसाइट् संस्कृत नागराक्षर ॥

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CENTRAL LIERARY

فهرست كتابهاي عربي وفارسي مطبوع كد در خاند اشيائك سوسيتي حسب تفصيل الذيل بقيمتهاي مناسب براي فروخت موجود اند

اسامي كتب قيمت فتاوى عالمگيري مرتب بشش جلد في جلد هشت روپيد عنايه جلد ثاني وثالث ورابع في جلد ... هشت روبيد شرائع الاسلام ... ... هشت روپيد انيس المشرحين ... ... پنج روپيد جوامع علم رياضي ... ... چهار روپيد ... پنے روپید اصطلاحات صوفية ... خزانة العلم ... ... هشت روبية تاريخ نادري ... ... هشت روپيه فهرست كتب كالج فورث وليم واشيائك صوسيتي يكروپيه



### JOURNAL

OF THE

## ASIATIC SOCIETY.

A THIRTEENTH MEMOIR on the Law of Storms in the Indian and China Seas; being the Charles Heddle's Hurricane in the Southern Indian Ocean, 22d to 27th February, 1845. By Henry Piddington. With two plates.

In my Eleventh Memoir (Journal Asiatic Society, Vol. XIV. p. 10,) I briefly announced the highly curious and beautiful experiment, for such in truth it is, which the Brig "Charles Heddle," Captain Finck, had been performing for us, and for the details of which the scientific world are most deeply indebted to him and to Captain Royer, Master Attendant at the Mauritius; and I have thought them of importance enough to form the subject of a separate Memoir, inasmuch as they will be found, for the Southern Hemisphere at least, to demonstrate beyond the possibility of a cavil, the fact that the great hurricanes are great progressive whirlwinds; the courses of the "Charles Heddle" during five successive days, admitting of no other explanation; and distinctly contradicting the notion upheld by Mr. Espy, and other American philosophers, that these storms are composed of numerous winds blowing directly inwards to a common centre, while that centre is moving onwards.

Another fact also demonstrated by this log, and one scarcely less important, is that of the tremendous "Storm Wave," to which I have so No. 166. No. 82. New Series.

5 B



frequently drawn attention,\* for there can be no manner of doubt that the "Charles Heddle" experienced a most extraordinary storm wave of four miles per hour during the storm, and this for five days successively. I refer to the summary and remarks for the details of this, and will only now observe, that this paper is arranged, like the preceding ones; giving first all the data; then the deductions from which the track of the storm, and other phænomena are laid down; and finally, such remarks as may occur. Amongst these last not the least interesting to the meteorologist as well as to the seaman will be the curious result shewn by the analysis of the winds for the five days, shewing them to have been involutes of a spiral curve!

Log of the Brig Charles Heddle, Captain Finck, from the Mauritius bound to Muscat, Nautical time, from Captain Royer, Master Attendant, Port Louis.

In forwarding this very remarkable log to me, Captain Royer, as I have elsewhere stated, observes that he thought it so singular, that he had taken the trouble to copy it with his own hand. In reply to farther enquiries from me, he states, that Captain Finck is an able and highly respectable seaman, and that his vessel, the Charles Heddle, was originally a slaver, and usually employed in the cattle trade between Madagascar and Mauritius, which requires always the fastest sailers. This accounts for her extraordinary success in scudding, which perhaps few vessels could have persisted in so long without imminent risk.

I have translated her log most carefully from the French, a language with which I am perfectly familiar, and I print it at length, that the whole document may be fully before the scientific public.

<sup>·</sup> See 8th Memoir, Journal Asiatic Society, Vol. XII.



Log of the Brig Charles Heddle, of Mauritius, Capt. Finck. Copied by Capt. Royer. Master Attendant at that Port, and translated by Henry Piddington. Nautical Time.

н.	K.	F.	Courses.	Winds.	Lee	Var.	Friday 21st to Saturday 22d Feb. 1845.
1 2 3 4	5555	4 4 4 4	NEbN.	ESE. Variable to SE.		NO STATE	Horizon very low (tres rappro- ché,) thick weather all round. Hea- vy sea, smart breeze, under the large sails, pumped every two hours.
5678	5566777	4		deset a			Sea and wind gradually increasing, vessel labouring greatly, weather squally, and threatening all round, the squalls very heavy. At 9h. 30' P.M.
12345678910112123456789	776666666667	4 4 4	North.	SE. SSE.			the main yard went in two in the slings, clued up and furled main top-sail, unbent main-sail, and secured the pieces of the main yard on the booms. In jib, and mizen; scudding under the fore sail, fore top-sail, and fore top mast stay-sail, to wait for day light;
4 5 6 7 8 9	66678888	4 4	201年,2017 2014年,2017	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			heavy squalls and sea. Down main topsail yard, and struck top gallant mast. Noon, in close reef fore top-sail. The gale begins to make itself be felt; sendding under fore-sail, and fore topsail. Latitude by account 16° 42′ S. Longitude account 57° 45′ E.
10	8		The same	100			Longitude account 57° 45' E.

Brig CHARLES HEDDLE, Saturday 22d to Sunday 23d February 1845.

н.	К.	F.	Courses.	Winds	Lee	Var.	Remarks.
1	*13		WNW.	ESE.			Very bad weather; frightful sea;
2	13	**	NW.	SE. SSE.			blowing very hard with incessant rain; vessel taking in seas over the quarter
123456789	ii	1.0	North.	South.	MARKE	問題	while scudding under the fore-sail, and
5	11		a light Chan	PAR SOL	imin	1	close reefed fore top-sail. Pumped
6	11 12	200			E	E	every hour, vessel labouring greatly from the seas which swept over us-
8	12		NNE.				At 2 p. M. perceiving that the head
9	12		The Paris Secret Co.	Charles in	The S	(A)	rope of the fore-sail had given way, sent
10	12	* *	NE.	Decort v	meg	22.5	two hands to cut away the earings, and let it come on deck, saved the
112	12	-3			1	•	sail. The fore top mast stay-sail
î	12		mestal and them				halyards having given way hoisted
11 12 1 2 3 4 5 6 7 8 9 10	12		E.N.E.	100000	5-14	97.57	the sail by a tackle. Gale at its
3	12 12	••	East.	The same		5 = 6	wind, as it continually veered round
5	12			<b>国神经</b> 点	FEW.	37/100	the compass; pumps, attended to:
6	12		DOD				vessel labouring excessively. It being impossible to clue up the fore top-
7	12	**	ESE.	Mark Local		1	sail without risking severe damage,
9	12		The state of the		1		we resolved to run our chance o
10	12		SE.	THE USE			what might happen. N.B. No position is given on this
11 12	12	**	SSE. South.	North.	E S	1	day.—H. P.
12	-	**	SW.	NE.	1		THE PROPERTY OF THE PARTY OF TH
	1			ENE.	1 10	1 15	
	Die 3			East. ESE.			

<sup>\*</sup> About is marked in the log.
† These last winds, and courses are so marked in the log, I presume they mean to designate the changes between Noon, and I A. M. on the next day, as a memorandum of the gradual veering.



## Brig CHARLES HEDDLE, Sunday 23d to Monday 24th February, 1845.

н.	к.	F.	Courses.	Winds.	Lee	Var.	Remarks,
123456789	12 12 12 12	::	sw. wsw.	NE. ENE.	••	15	Weather always the same with a frightful sea. Shipping from time to time very heavy seas. One filled the whole deck fore and aft with
5 6 7 8	12 12 12 12 12	•6, 1	West.	East.			two feet of water; the larboard waist board carried away, much water going down the hatchways and cabin scuttle,
10	12	::	WNW.	ESE.		3	P. M. fore top-sail blew away, scudding under bare poles, the new fore top-
11 12 1	10		NNW.	SSE.			mast stay-sail giving way, saved it; two men at the helm, vessel labouring greatly, storm always at the same
1 2 3 4 5 6 7 8 9 10	10 11 11	. **	North.	South.			height, winds veering round the com- pass from hour to hour, and even in half an hour.*
6	11		NNE.	ssw.			Brought all the crew aft into the cabin to be at hand, closed up the fore-
8 9	11 11	::	NE. ENE.	wsw.			N.B. No position given on this dayH. P.
10 11 12	iii		East.	West.			

Brig Charles Heddle, Monday 24th to Tuesday 25th February, 1845.

н.	K.	F.	Courses.	Winds.	Lee	Var.	Remarks.
1 2 3 4 5 6 7 8 9 10	11 12 12	••	ESE.	WNW.	•	13	The gale always at the same degree of strength, but the squalls a little heavier, pumps always in hand, vessel
4	12		SE.	N.W.	100	150	making water. All the cabins below
5	12	1000	THE STATE OF THE S	1000 000			wet, the provisions in the great cabin
6	11	100	SALES OF THE SALES	-	111	10000	also wet, the vessel making water
7	11	1000		*******			through every seam in the deck with-
8	11	2.00	SSE.	NNW.		100	out exception, baled the water out of
9	11	**	South.	North.			the cabin by buckets. Shipped several seas which went
10	-	1000		50		N. D.	over all.
19	11	FEE		The Same Sale	12		At two in the morning the vessel
	11	1000	SSW.	NNE.			broached to, the water two feet deep
2	ÎÌ	77.70	SW.	NE.		0	on the deck. We remained in this
3	11		WSW.	ENE.	101	100	dangerous position for about ten mi-
4	11	AT BELLEVILLE	<b>南田市</b>			61 7	nutes, when she righted. We broach-
5	11		497	East.		13.	ed to again several times from the
6	11	-	Wost.	ESE.		1	speed of the vessel; cleared the scup- pers. At 10 shipped a sea in the
7	111	**	W IN W.	ESE.			fore rigging which carried away jib
11 12 12 3 4 5 6 7 8 9 10 11 12	11	10.00	NW.	SE.		132-4	and flying jib booms. Cut away the
10	ii	HEAD	THE RESERVE OF STREET	THE PERSON NAMED IN			wreck to clear the bowsprit.
n	111		NNW.	SSE.		1	Latitude by a doubtful ob-
12	11	10000	NAME OF STREET				servation, 16º 18' S.
	-	1330			-		Longitude Chronometer, 53° 2' 30"

The expression is "faisant le tour du compas d' heure en heure et meme une demi heure," of which the literal translation would be, "going round the compass from hour to hour and even in half an hour." What is meant is evidently (by the log) that the wind was going round the compass and changing every hour or every half hour.

† The words are "par la vitesse du batiment." No doubt the difficulty of steering her is here implied.—H. P.



1845.]

### Brig Charles Heddle, Tuesday 25th to Wednesday 26th February 1845.

н.	к.	F.	Courses.	Winds.	Lee	Var.	Remarks.
1 2	11	::	North. NNE.	South. SSW.		20	The gale always at the same strength without the least intermission,
4 5	11 10 10		NE. ENE.	SW. WSW.			heavy sea and rain. The tiller ropes gave way, changed them, the bolts also
6	10		East. ESE.	West. WNW.			of the tiller having given way, drove in preventer ones. P. S. Every hour. The trusses of
23456789	10		SE.	NW.			the fore-yard gave way, replaced them; scudding under bare poles. The sea
10	10		SSE. South.	NNW. North.			frightful, vessel making much water through the deck.
12	10		SSW.	NNE.		WE ST	Crew worn out with fatigue. Thesun
3 4	10	••	WSW. West. WNW.	ENE. East. ESE.			by we obtained an indifferent latitude and longitude.
5	10		NW.	SE.			Latitude by indifferent ob- servation, 18° 02′ S. Longitude ditto ditto, 51° 2′ 30″ E.
5 6 7 8 9	10		North. NNE.	South.		in	Longitude ditto ditto, 11 of 2 oo B.
10	10		NE. ENE.	wsw.			
11	10	••	East. ESE.	West. WNW.	1		

### Brig Charles Heddle, from Wednesday 26th to Thursday 27th Feb. 1845.

н.	K.	F.	Courses.	Winds.	Lee	Var.	Remarks.
1	10		SE.	NW.	74.0	1	The horizon always obscure though
2	10	**	SSE.	NNW.	1	10,10	sometimes clearing a liftle, but the
23456789 10112123456789	10 9 9 9	10 -36	A G Shaper -	ME TO SER			squalls and sea always heavy, pumped
4	9	100	South.	North.		1000	Always under bare poles. At 10 P. M.
6	9	::	SSW.	NNE.	1945	31.	clearing up a little, and we saw some
7	10	Garage a	wsw.	ENE.	3-0		stars, but the sea and wind always
8	10		West.	East.	E state	MAG	heavy.
9	10		NW.	SE.	100	•	Bent fore top-mast stay-sail, and fore
10	10		NNW.	SSE.	150		and aft mainsail with two reefs in it.
11	10		North.	South.	100	F-581	Bent another fore top-mast stay-sail on
12	10		NNE.	SSW.		E	the fore stay to balance the vessel's
1	10		NE.	SW.	1	1 20	sails.*
2	10		ENE.	WSW.	1	1000	Scudding always according to the
3	10	**	East.	West. WNW.			Seeing that we had sustained much
4	10	100	ESE.	NW.	1	State of the last	damage, and that we were nearer to
9	10		SSE.	NNW.	-		the Mauritius than to any other place,
0	10	1000	South.	North.	1975	1 1500	the Captain resolved to return there,
é.	io	- Control	SSW.	NNE.	1000	1	not considering the vessel in a state
ğ	10		SW.	NE.		10.000	to continue her voyage.
10	10		wsw.	ENE.	1		Latitude observation, 20° 12' S.
11	10		West.	East.			Longitude chronometer, 52° 24' E.
11 12	10		The second second			1 3 3	

<sup>#</sup> i. e. When sail should be made, having lost the jib boom.



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Brig CHARLES HEDDLE, Thursday 27th Feb. to Friday 28th Feb. 1845.

н.	к.	F.	Courses.	Winds.	Lee	Var.	Remarks.
12345678910112123456789	777766666666666666666666666666666666666	444	SE. SSE. ESE.	ENE. Variable to NE.			The weather becoming fine, bent the fore-sail, and spare fore top-sail, took the main top-sail yard for a main yard, and let the reefs out of the fore and aft main-sail.  Cloudy still, and lightning in all quarters.  Fine, and sea smooth with a pleasant breeze.  Latitude observation, 20° 19′ S. Longitude chronometer, 54° 29′ 28′
1 2 3 4 5 6 7 8 9 10 11 12	666666666666		AN IPONTO		1873 1873 1873 (Side)		

I shall notice this log separately, but at present, I proceed to print the remaining documents, so as first to adduce from them the general track of the storm, and then take up the peculiar investigations which this log gives rise to.

Abridged Log of the Ship APPOLLINE, Captain THOMAS, from the Mauritius, bound to Calcutta. Civil time.

The Appolline left the Mauritius on the 19th February 1845, with light N. Easterly winds to midnight of that day.

20th February. Winds ENE., East, and variable; at 11 A. M. cloudy suspicious weather, at Noon heavy squall and rain, latitude by account 18° 50', Round Island having borne at 6 A. M. SEbS.\* since when the ship had made 23' NNE. hence the longitude about 57° 50' East. P. M. to midnight squally, moderating and freshening again, wind from NEbE. and East, ship standing from noon to midnight to the NEbN. and NNE.

21st February. A. M. wind ESE. fresh breeze and cloudy, vessel standing to the NEbN. 68' to latitude 16° 52' S. longitude 58° 10' East by

<sup>\*</sup> Distance not given, or I have omitted it.



account. P. M. Barometer falling, making preparation for bad weather. At midnight brisk gales and cloudy, ship standing to the NE. wind SEbE.

22nd February. A. M. wind SEbE.; by noon blowing a complete hurricane in the squalls. 4 A. M. hove to. P. M. wind marked EbS. weather the same and a cross sea; at 8, Barometer still falling.

23rd February. The same; heavy gale and rain; blowing a complete hurricane during the squalls. At 8 A. M. Barometer 28.5, wind marked ESE. to noon, and P. M. SEBE. To midnight, the weather the same.

24th February. P. M. wind marked East; at 8 A. M. blowing a complete hurricane with much rain. Bar. 28° 5′ ship under bare poles, head to the Northward. P. M. the same. Wind EbN. and at 3, NEbE. At 2 P. M. wore ship to the SE. the weather the same.

25th February. At 4 A. M. more moderate, Barometer rose 0.2. At 8 A. M. made a little sail. Noon latitude account 16° 53', longitude 55° 31' E.\* and by midnight the weather was moderate.

Abridged Log of the Ship John Adam, Captain Mansfield, from Mauritius to Calcutta, reduced to Civil time.

The John Adam left the Mauritius in company with the Sophia, and at noon, 20th February 1845, was in latitude 14° 36′ S. longitude 59° 38′ E. with a fine SE. trade. P. M. the same; midnight calm.

20th to 21st February. A. M. wind ESE., East, and at noon NNE. A. M. squally, no Obs. latitude account about 12° 30' longitude 59° 30' E.

P. M. increasing wind Northerly; vessel standing to the Eastward, with a high confused sea. 9 P. M. wind N.W. course NE E. 4 P. M. Bar. 29.50, made preparation for bad weather. 10 P. M. to midnight hard gales and constant rain. Wind NW. from 9. P. M.

22nd February. A. M. moderating, NW. wind, and ressel-making sail. accordingly. Noon, no observation, latitude by account about 11° 30′; longitude account 61° 10′ E. Barometer 29.50, thermometer 83° 10′ squally and unsettled, wind NW. P. M. to midnight wind NNW. the same weather.

<sup>\*</sup> Perhaps by Chronometer, worked by the latitude by account.

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23rd February. To noon wind NNW. and weather becoming settled, latitude 16° 26' S. longitude 62° 44' East. Barometer 29.75; thermometer 80° 40'.

Abridged Log of the Ship SOPHIA, Captain SAXON, from Mauritius to Calcutta, reduced to Civil time.

The Sophia left Mauritius on the 16th February .-- .

19th February,-At noon in latitude 16° 4' S., longitude 58° 44' E., Thermometer 84°, and fine weather, with three to five knot breezes, from East to ESE. P. M., decreasing breeze and cloudy to midnight.

20th February .- A. M. winds variable SE. to noon, with squalls and heavy rain. 8 A. M. dark, squally, threatening appearance. Noon latitude observation 14° 40' S. longitude 59° 13' E. Barometer 29.88. Thermometer 62°. P. M. wind Easterly, variable, and NE. Towards 9 P. M. Northerly, and weather very threatening, making preparations for bad weather, at 10-30. P. M. sudden shift to the East.

21st February .- A. M. winds to noon South, SE. East and NE. Noon, heavy squalls and thick rain. Bar. falling, and all preparations for bad weather. Latitude account 12° 51' S. longitude 59° 38'. Barometer 29.60. Thermometer 81°. 1 P. M. tremendous heavy squalls, wind N. Westerly, every appearance of a hurricane. - 7 P. M. Barometer 29.30. At 10 P. M. blowing a fresh gale, ship standing to the NE. 7 knots per hour\* with wind at NW. to midnight.

22d February-Midnight more moderate, and Barometer rising. Daylight out all reefs, wind North, latitude noon by account 11° 21' S. longitude 61° 00'. Barometer, 29.79. Thermometer 81°. Weather squally. P. M. weather still thick, but by midnight clear.

Abridged Extract from the Log of the Ship RANGER, Capt. STEPNEY, from the Mauritius bound to Madras, reduced to Civil time.

At Noon 19th February, 1845, the Ranger was in latitude 13° 34' S., longitude 60° 20', light winds N. calms with a heavy appearance to the NE. and hazy horizon. Midnight sea smooth, cloudy and squally.

<sup>\*</sup> The right course in the Southern Hemisphere, for she was on the NE. quadrant of the Storm .- H. P.



1845.]

20th February.—Noon latitude 12° 56' S., longitude 60° 53' E. light variable South and SE. airs, hazy sultry weather, and uncommon black squally appearance to the Northward. P. M. wind veered to the Northward, remaining variable and squally to midnight, and between North and NbE. with calms and squalls and thick dark weather.

21st February.—To noon increasing breeze NbE. latitude observation 12° 31' S., longitude 62° 00' E.

Note, for the last two days a current to the West of about 1 mile per hour.

P. M. Fresh gale increasing to midnight, from North at noon, at P. M. NbE. to NbW. and at 12 North again. Midnight increasing gale and squalls.

- 22nd February.—A. M. to noon fresh gale and hard squalls, the wind hot and sultry. At noon, latitude 12° 0′ S., longitude 64° 3′ E. Var. 5° W. course by observation is EbN. 4 N, 127′. P. M. to midnight fair.

23d February.—Noon light and fine weather, latitude 11° 26' S. longitude 66° 18' E.

Abridged Log of the Brig Arpenteur, Captain J. Stillaman. Forwarded
by Captain Royer. Reduced to civil time.

The Arpenteur, with a cargo of bullocks, (from Madagascar?) hove to at 8 A. M. and at Noon 25th February, it was blowing a hurricane from SE.; she was then in latitude 18° 50′ S., longitude by chronometer 53° 40′ E. The main topsail blew from the yard, and she was thus under bare poles. The run for the previous twenty-four hours (nautical) is not marked, but the wind which had been gradually increasing from noon 24th, from ESE, at 10 P. M. is marked 6E, to noon 25th. P. M. The same winds and weather to midnight.

26th February, A. M.—Wind SSE.; most of the sails blown from the yards, vessel lying to on the larboard tack. At 2-20 P. M. calm, with a heavy sea breaking fore and aft over the Brig. At 3 P. M. the wind came from the NW. and blew with the same force; the squalls heavier till midnight.

5 c



27th February, A. M. From 8 P. M. on the preceding day to noon on this day, the wind is marked as blowing all round the compass. At 3 A. M. more moderate; at daylight clear weather, made sail; and at noon, fine. Latitude by observation 19° 11' S. Longitude by chronometer 51° 14' 45" E.

Abridged extract from the Log of the Barque Commerce De Bordeaux, from Bourbon to Pondicherry. Civil time. Forwarded by Captain ROYER.

We have fortunately for this vessel's Log a newspaper notice, as follows:

"French bark Commerce de Bordeaux\* from Bourbon, the 28th February, bound to Pondicherry, experienced on the 23rd in latitude 14° 37' S., and longitude 54° 44' E., a hurricane which lasted three days, commencing at SE. and round the compass; lost mizen mast, and main topmast, mainyard, sails and boats."

This gives us the spot where the storm commenced. lost sight of the Maupertuis at noon 21st, and stood to the N. Eastward with the SE, trade.

22nd February, A. M .- Standing to the N. Eastward. Noon, freshening. P. M. squally weather; wind increasing from SSE.; at 4 P. M. close reefed, and hove to.

23rd February, 1 A. M.—Blowing a gale from SSE.; veering to South at 5 A. M.; and SE. at 8. At 9 A. M. calm; ship not steering. Soon after noon, wind NE. increasing fast; vessel scuds to the SW. 9' per hour. 4 P. M. hurricane. Barometer two lines below "tempéte."+ heavy sea; at 5 " wind is furious." The wind is now described between 5 and 7 P. M. as making the circuit of the compass several times!

At 7 P. M. blowing harder; the fore topmast staysail split, and the vessel broached to, and lay upon her beam ends till 91 P. M. when the mizen mast being cut away, and the main topmast going, she bore up; main yard arm is carried away and launch stove. No winds marked from 4 P. M. to 9 A. M.; hurricane at full, and sails blowing from the yards.

<sup>\*</sup> My copy says, Courier. It may be my own mistake or that of the paper, but there is no doubt that this is the vessel, as the damage sustained is the same. + I do not know what this is; I presume like our own "stormy."

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24th February, A. M.—Ship buried in the sea; hurricane as before. At daylight trying to collect the wrecks; the wind continually veering all round the compass, but from 9 to Noon wind is marked ESE., and course WNW. seven miles per hour. P. M. wind marked variable, and going all round the compass; vessel going seven knots. 5 P. M. to 8, the same wind marked as going round, and vessel steering different courses, but weather moderating a little from 9 to 12; the wind always going round the compass.

25th February. Wind at 1 A. M. ENE.\* Vessel's course as SSW. six knots. At 10 A. M. moderating a little: 1 P. M. the same, but still scudding under bare poles to the WSW., and SW. at 10 to midnight.

26th February, A. M.—Scudding under bare poles to the SW., but only four and five knots marked; wind moderating. 9 P. M. the same, but finer weather.

27th February, A. M.—The weather gradually moderating till noon, when it was fine; with the wind at NNE., and NE. from midnight.

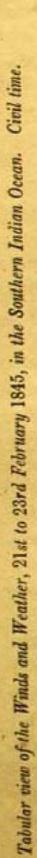
From the "Cernéen" a Mauritius Newspaper, I have extracted the following notice.

"The bark Marie Laure, experienced on the 24th and 25th ultimo, a heavy gale of wind from the SE. Latitude 18° 20' S. and longitude 53° 30' E., in which she lost sails and seven bullocks."

I have also had forwarded to me the Log of the ship Faize Rubahny, from Calcutta bound to Mauritius, but it unfortunately contains no longitudes, and from the weather and latitudes, I judge her to have been too far to the Eastward to have felt any part of this storm.

I now give a tabular view of the wind and weather from the 21st to 23rd February, as in the former memoirs.

\* No doubt a clerical error, and NNE. is meant, for at 1 P. M. ENE. wind and WSW. courses are again marked.



Thur	teentn	Memoir o	n the L	aw of S	torms in	India.	[L	0.	166.
o Remarks.	Current to the West.	Every appearance of a hurricane, 10 p.m. a fresh gale, ship standing to the NE. Barometer on the 20th was 29.88.	Midnight hard gale and rain, wind NW. from 9 P. M.	Midnight brisk gales SEbE, and cloudy, Barometer falling. Ship standing to the NE,	Midnight wind SE. running to the North; latitude then 17°53', longitude 57° 47'.	Midnight fair. By midnight clear.	Note, position uncertain.	No position given.	Wind not marked at noon, but nearly this
ier.	. :	-			:	::			
2	• :	≅,	:	:	:	: ::	88	:	1
Simp. Ther.						::			-
Siis	:		:		:	::		:	100
Barometer.	:	29.60		Falling.	:	29.79	29.50	Falling.	•
Winds and Weather.	Fresh gale, increasing to mid- night from Northward,	N. Westerly 8 P.M. Tremendous heavy squalls,	Squally Noon, wind NNE P.M. increasing from the Northward, 9 P.M. NW.	Fresh breeze and Cloudy	Thick weather blowing fresh ESE, to SE, heavy sea,	Fresh North breezes,	Wind NW. squally and un- settled,	Hurricane at EbS	Hurricane about ESE
Long. B.	62.00	59.38	29 30	28 10	57.48	64 3	69 99	:	57 45
Lat. S.	12 31	12 51	12.30	16 52	19 14g	12 0	11 30	:	16 42
						1::	:		
Name of Place or Ship.	Ranger,	Sophia,	John Adam,	Appolline,	Charles Heddle,	Ranger,	John Adam,	Appolline,	Charles Heddle,
Date.	Noon 21st Feb.					Noon 22d Feb.			



Remarks.			Blowing a complete hurricane in the squalls.	Scudding for the whole 24h.	See Newspaper notice.
Barometer. Simp. Ther.		90 4			
			•	•	·-
Simp		80 4			
2			×		:
nete	100	29.75	8 A.		
Saroi		81			
ш			83	:	:
Winds and Weather.	Light breezes and fine wea-	62 44 · NNW. and settling,	A. M. ESE. and P. M. SEBE. 18.5. 8 A. M	Hurricane all round the compass,	Hurricane commenced here,
Long. E.	66 18	62 44			54 44
Lat. S. Long. E.	11 26	10 26	:	:	14 37
					Bor-
Name of Place or Ship.	Banger,	John Adam,	Appolline,	Charles Heddle,	Commerce de Bor- deux,
Date.	Noon 23d Feb, Ranger,				

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Note. From this day we have only the logs of the Charles Heddle and Appolline, and on the 25th that of the Arpenteur, which are so easily collated that it is not worth while putting them in a tabular from.



#### SUMMARY.

The following are the considerations from which the track laid down in the Chart No. 1, has been deduced.

Taking the storm to have originated and come from the Eastward, as we have reason to believe they all do, the most Easterly log we have, which is also the first in point of time, is that of the Ranger, which vessel seems, on the 19th and 20th February, to have passed to the Southward of the storm (or of a storm) in between latitudes 13° and 12′ S., and on the 21st and 22d February, perhaps to have skirted its Eastern edge in longitude 62° to 64° East. On the 21st we have the Sophia apparently running up and passing close to the NE. border of this storm, having had the weather fine on the 19th, and threatening on the 20th, in latitude 14° 40′ longitude 59° 13′, with her Barometer at 29.88. The John Adam, in company with her, also with the wind at NW. from 9 P. M. of the 21st and like her standing fast to the NE., and thus out of the storm circle.

To the South we have the Appolline and Charles Heddle at midnight 21st to 22nd

The Appolline with weather announcing an impending gale in about latitude 16° 20' the wind being at SEbE. and the vessel standing to the NE. while the Charles Heddle had at this time, in latitude about 17° 53' longitude 57° 47' the wind so heavy at SE. that she was already scudding.

The distance however, is so great between the vessels to the North and those to the South,—for taking the Sophia and John Adam as close together, and the mean distance between the Appolline and Charles Heddle's positions as an opposite point, it will be upwards of six degrees—that we cannot allow them all to have shared in the same storm, particularly as the Appolline, though farther North, had not the winds, it appears, so strong as the Charles Heddle, so that as I take it these were the preliminary streams of wind, to which I have before adverted in former memoirs, which precede as I suppose the formation of a true vortex.\* I have thus only marked the different midnight posi-

<sup>\*</sup> I have more than once said in the course of these Memoirs, that these circular vortices must begin somewhere and somehow, and have suggested that they do so by streams of wind. From Mr. Rechendorf, a German gentleman educated as a mining

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tions between these dates for reference, and pass on to Noon of the 22d, on which day we have only the Charles Heddle and Appolline on the southern side of their storm, for they were clearly in the same hurricane. The John Adam and Sophia were now of course far out of the influence of the threatening weather which they had experienced.

Centre of 22nd February.—As the Charles Heddle, at noon 22nd, had a hurricane at about ESE., and as we shall subsequently shew, was scudding in a circle of but little more than 60 miles radius, it follows that the centre bore about NNE. 60 or 70 miles, from her position.\* We have not that of the Appolline to compare, but we find that she had the wind at E. by S. also blowing a hurricane, and was lying to, and as she could not be far from the Charles Heddle, I have placed the centre as it relates to the latter vessel only, which will also give the Appolline the wind as she had it, and on about that part of her drift, which is all we can mark for her, at which she was at this time.

Centre of the 23rd February.—We have at noon the Charles Heddle's position, as near as her corrected run will give it, and find that she was then on the Eastern range of her first circle, having the wind at North, and that this circle (see post) was of about 122 miles in diameter, or 61 miles radius; which distance to the West gives the approximate position of the centre of the storm for this day. A circle on the general chart cuts the Appolline's drift line to the West, as she was drifting that way, so as to give her a wind at about ESE, between which and SEbE, she had it by log. Her drift for want of data, is marked merely as a straight line, but she might have made more southing, and thus have been further from the centre, though on the same bearing from it, and with the same wind. We find on this day also that the Commerce de Bordeaux, first appears to have felt the hurricane, and this agrees well enough as to distance with our centre, which is at 140 miles from

Engineer, I had a curious account of the dust-whirlwinds, several of which in Upper India he had run after and penetrated. He describes them as forming a thick broad wall of dust, through which it was half suffocation to penetrate, but when in the centre it was nearly calm, with nothing but the wall of dust visible. He farther told me, that he had seen large ones commence, and that they did so in segments, which afterwards united. This is exactly our supposed "streams of wind," but then we know not if the causes on shore are the same; there may be two or more causes producing circular atmospheric motion.

\* See however what is subsequently said as to the incurving winds.

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her. Unfortunately we have nothing of this vessel's position beyond a bare notice and an imperfect log. The direction of the wind does not agree however very well with her position, the log giving SSE. veering to South, the point from which the hurricane commenced, and our centre shewing SSW. as the wind with her at noon. I think it however not improbable, and indeed most likely, that this vessel had a separate storm, for it is difficult to suppose that she could have fallen into the Charles Heddle's and gone through the veerings and scuddings her log shews, without the vessels having seen each other, but an ignorance of where she was when the storm terminated, makes every thing uncertain about her.

For the centre of the 24th February.—We have the Charles Heddle on the northern periphery of one of her circles, of which on this day the radius does not appear to have exceeded thirty-five miles. She had the wind about WbN. at noon, which places the centre SbW. from her, and this agrees perfectly with the Appolline's log, which ship had a furious hurricane at East and EbN. veering to NEbE. or three points, by 3 P. M. or in three hours, which with her low Barometer 28.4, shews she was also very near to the centre.

For the centre of the 25th February.—We have the Charles Heddle scudding on the West side of one of her circles, with the wind at about SbE., and the radius of the circle about twenty-six miles for this day, the bearing of the centre being therefore EbN. of her. This agrees perfectly with the position of the Arpenteur, with which vessel the hurricane begins this day at SE.; our circle making it SE 3E. We have not the Appolline's wind, and but an indifferent position for her on this day, so that she may well have been a little farther from the verge of the circle than she is marked. The Northerly veering of the wind with her from noon 24th, though without any marked rise of the Barometer till the next day, is exactly what should occur with a vessel hove to in her position, and a storm (in the Southern Hemisphere) passing her to the westward.

For the centre of the 26th February.—We have the Charles Heddle on the NE. quadrant of a circle of twenty-five miles radius, with the wind about NWbW. placing the centre to the SWbS. of her. The Appolline had now fine weather. The Arpenteur, which vessel had the hurricane from the SE. and SSE. and was hove to, had the wind SSE.



till 2.20' P. M. on this day when it became calm and shifted to the NW. that is to say, the centre passed her (or she drifted across it?) to the eastward of her position at that time.

We have not her position at noon this day, and I have therefore estimated it only, by allowing her to have drifted bodily to leeward at the rate of three miles per hour on a West, WNW. and NW. course, which will give, with variation and a current of 2' per hour to the SW. a course and distance of N. 85° W. 90 miles, which is the best estimation we can make. I have not allowed her the full current which the Charles Heddle experienced, because as I shall elsewhere shew, I do not at present\* think it probable, that the effect of the Storm Wave extends strongly to any great distance from the centres, though the storm Currents are felt all over the vortex.† The Arpenteur certainly did not partake of the Charles Heddle's storm wave to the SW. for her position on the 27th is about what a vessel might have been drifted to by the mere effects of the hurricane and storm Currents.

For the log of the 27th February .- At noon the Charles Heddle, though she had made one more turn round her circle since the 26th, appears to have the fine weather commencing, i. e. at length to have scudded out of the hurricane; or it might have left her. She appears at noon to have had the wind about EbN. which would give the centre bearing NbW. from her, and I should consider, though the average of this day gives but twenty-five miles, yet that by this time, Noon, she was at a much greater distance from it, the weather now beginning so evidently to be fine. We shall thus not be far wrong, if we say that at noon the centre bore NbW. forty-five miles from her; this distance, forty-five miles, being it will be seen, the average distance of the whole five days, and it will be noted on the chart, that this still keeps her, as our averages shew, within about twenty-five or thirty miles of the centre till about six A. M. when she begins to increase her distance from it, so that it is probably very close upon the truth. This position for the centre will place the Arpenteur, which also had fine weather returning from 3 A. M., at sixty miles from the centre, with about a SWbS. wind, if she still partook of the same hurricane.

<sup>\*</sup> I say at present, because it is not wholly impossible that this view may be modified.

At present all the facts we have, appear to tend to this supposition.

<sup>+</sup> The reader will find the word storm wave, and storm current explained in the Eighth Memoir, Jour. As. Society, Vol. XII. p. 398.

There is however one anomaly here, which we must note. In this twenty-four hours, as I have above remarked, the Charles Heddle clearly scudded round the last of her circles, between Noon 26th and 5 A. M. 27th, and at the same time, that is, between Noon 26th and 3 A. M. 27th the Arpenteur, at an average distance of thirty miles from her, also drifted round a circle, having the winds it is said "all round the compass." Now this evidently could not be the same vortex, and we must therefore suppose that, as has been so often shewn before, the storm here divided, which may have been the prelude to its breaking up? I have therefore marked two centres and two circles for the 26th and 27th, and my readers will judge for themselves of the probability of their truth. It is possible however, as the Arpenteur's log is but very loosely written, that there may have been only a series of varying streams, not enough to be evidence of a true circle.

We have no data for tracing the storm farther to the Westward, and I shall now advert to its rates of motion as shewn by our centre, and their relation to the Charles Heddle's spirals. The rates as shewn by the projection on the chart then, are,

22nd	to	23rd	70	Miles.
23rd	to	24th	100	n
24th	to	25th	115	4.
25th	to	26th	89	1)
26th	to	27th	85	-11
		5	) 459	
	Per	day	92	Miles.
ern Mari	Per	hour	3.8	

THE LOG OF THE "CHARLES HEDDLE," SEPARATELY CONSIDERED. See Plate II.

So many interesting questions must arise in the mind of every seaman and of every scientific man, though not a seaman, in examining this log and the diagrams which I have given in Plate II, that I have thought it proper to devote a separate section to their consideration. would almost indeed afford materials for a separate Memoir.

And first let me say, that, writing alike for the seaman and landsman, I shall endeavour to make myself quite clearly understood by the latter, and may thus at times appear prolix, or ostentatious of professional

knowledge; but as this detail is necessary to a thorough understanding of the subject by all, I cannot dispense with it.

The points for consideration then, are -

- 1. The accuracy of the Charles Heddle's log as a whole, and in its parts.
  - 2. The nature and strength of the current she experienced.
  - 3. The construction of the Diagrams in Plate II, from the log.
- 4. The sizes and probable forms of the vortices round which she scudded on different days, and her distance from the centres.
- 1. The accuracy of the Charles Heddle's Log, may certainly, I think, be taken as being as great as the circumstances would allow. Captain Finck is known at the Mauritius as an experienced and a careful seaman; and to this indeed his log bears full testimony; but there are many circumstances which (on board a merchant ship particularly) would unavoidably induce a less degree of accuracy than on board a man-ofwar in like circumstances; and taking it that she was steered as correctly as a vessel could be steered in such weather, and perhaps even from her fine qualities as a sailer better than some men of war, the first question in the mind of a sailor is-"Yes; but how often was the log hove in such weather?" We should reply to this, first, that in the hands of many (young) officers, in such weather, and when runing from 10 to 13 knots, the common log is as liable to error even if it was hove, as the guess of the experienced seaman. We have all known a young, or a careless officer report a ship going nine, when she was going ten knots, and especially at night, when it is not easy for the person heaving the log to have one eye, and a hand to the line, and the other to the holder of the glass, who is often half asleep; or on the other hand, that a fault in paying out the line too fast, or want of quickness at the glass or line may give eleven knots when ten or ten and a half are the truth; and in fact most seamen heaving the log really make their own allowance for any deficiency or excess they may suppose from any cause, and mark the run accordingly. I speak here of the common log only, and not of the patent ones, which are doubtless far more correct. But in the end, one error of our guess or measurement by log corrects the other, and we may, I think, fairly say that, though doubtless in such a hurricane of five days' duration the log was not hove with any regularity, and especially during the night, yet the average of any day's run is not far from the truth as to distance? The latitudes as given are the next consi-

deration, and here I think we may fairly reject the latitudes, and consequently the longitudes, given on the 25th and 26th, for it is difficult to suppose between the "frightful sea," (a literal translation) the motion of the vessel, the mere glimpses of the sun obtained in such weather, and often, if any horizon is seen, the difficulty of knowing if it be the true one, that any correct observation could be obtained. For the same reasons also, the hurricane still continuing, I should attach so little faith to the observation of the 26th, that I have preferred rejecting them both, and taking the two positions of Noon on the 22nd and Noon 27th as fixed and well ascertained points, by which to estimate the average current experienced for the whole five days; and I think every seaman will agree with me, that this is the safest course as to probability, and consequent approximation to the truth.

2. The nature and strength of the current she experienced.

When the Charles Heddle's log is worked for the whole five days with simply the allowance for variation,\* she will be found to have made good, as noted on the Diagram Fig. I, a course of North 42' E. distance 111', in the five days from November 22nd to November 27th; but by her Chronometer and observations she had really made good, as in Diagram Fig. II. a course of South 55° W. 366'. So that she must during the five days have experienced a current of S. 52° W. 476 miles! or in round numbers, (which would require 480 miles,) four miles per hour for the 120 hours, or five days, of the hurricane. I have already explained why I should reject wholly the observations on the intermediate days, and this compels us to take the whole as a general average, being without any positive knowledge as to whether its force or direction was different on different days. It is clear that if the direction was

<sup>\*</sup>There is considerable uncertainty as to the variation in this tract between Bourbon, the Mauritius and the coast of Madagascar. On this last coast it is marked in Norie's Tables, ed. of 1844, which I take to be from the latest authorities, as 16° Westerly at Foul Point, latitude 17½ S.; and as 21° Westerly at Fort Dauphin, in latitude 25° S.; and at Mauritius as 14° 20′ West, but we do not know how late this is, and if the variation is increasing or diminishing; and I have not access to any very late works or charts. I have thus allowed 1½ points for the first three days, and 1½ points for the last two. This may be slightly erroneous, but we do not know any thing as to what may have been errors of steerage, misplacing of compasses, and local variation, and ½ of a point more or less for a day or two would not make any difference in this kind of circle sailing, as I have satisfied myself by working over the logs of 23d and 24th with 1½ point variation, when the result for the two days was only three miles South and four East of that given by the variation used, which is quite insignificant either as to general results or the projections of the Chart and Diagrams.



at all different, the force of the current must have been greater, as the distance taken is the straight line between the points, and any deviation from that must make a greater distance. In as far then as rate is concerned, we have (supposing the run to be on the whole correctly estimated) taken the lowest.

3. The construction of the Diagrams in Plate II from the log.

The seaman will easily understand these (and I hope appreciate the tedious labour they cost), but writing for the meteorologist, and general reader also, I must explain that Fig. 1, is simply the courses and distances of the log corrected for variation, and laid down on a plane chart.

For Fig. II. every separate course and distance was first worked as for a traverse, and then to it was applied the average current of S. 55° W. four miles per hour, for the number of hours of run on that course, and this corrected course and distance, taken as being the true one, was then laid down; and the result of all these produces from point to point of the five day's scudding, the singular set of spirals shewn in the Diagram!\* And these are in all probability not far from the average truth, as we shall now shew.

The size and probable form of the vortices round which the Charles.

Heddle scudded.

There are three kinds of calculations to be made as to the size of the vortices. The first is to take the number of turns made in the whole five days against the whole distance run by log, and taking this as representing the sum of the peripheries of so many circles as there are turns, the result divided by the number of turns will give the average size of the circles, and consequently from their diameters the average distance from the centre at which the brig scudded.

The second is to consider each separate turn or circle made according to the log, with the number of hours employed, and distance run in making it, and to use this to determine the probable Diameter of the circle sailed round; and the last, which will perhaps assist us in forming a notion of the shape of the vortices, to take each half circle only to calculate from in the same way. I shall shew the result of each of these calculations, premising that I take the circle or half circle to be com-

The points marked with dates on the diagram are the positions of the vessel at noon each day; and are those taken for the same days on the general chart also.

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pleted at the nearest time and distance to which the log allows us to calculate it.

First, it appears then that from November 22nd to November 27th, the Charles Heddle completed as follows:—

	lst	Turn in	24	hours,	running	387	Miles.
THE PERSON	1	delin .	38	**	**	426	0.4
	1		23	**	.,0	243	. "
	1		17	**	,, .	167	33.
profes a	1	"	15	0.		150	10
Sums,	5	turns in	117	hours,		1373	Miles.
Means are	1	turn in	$23\frac{2}{5}$	hours,	,,	${274\frac{3}{5}}$	Miles.

The average circle then was  $274\frac{3}{5}$ , or say 275 miles in circumference, which would give not quite 90 miles of diameter, and the Brig's average distance from the centre, being the half of this, at about forty-five miles.

Again, five turns of the circle are 160 points, which in 117 hours are 1 point and three-quarters in an hour, and the 1373 miles divided by 160 are 8-6 miles of distance for each course, or chord of each arc. Taking every separate turn we have,

	SEL LET A		Diameter.	Distance from the centre.
1st Turn	387 Miles	of circumference, or	123.3	61.6
2nd ,,	426		135.5	67.7
3rd ,,	243	" The state of the	77.3	38.7
4th ,,	167		53.2	26.6
5th ,,	150	· · ·	47.7	23.8
			437.0	218.4
	Pon entre in	Average,	IL out oppose	44.6

Taking every separate half turn, which is suggested by the evident tendency of the spirals, and choosing from the log each half circle from WNW. to ENE. by compass,\* and from ENE. to WNW. again, we have first,

<sup>\*</sup> About, or W. N. and E. S. true course, on an average.

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				Circle of	Mean.	Diamr.	Distance from the centre.
1st turn 22nd	Ist half c	ircle. 14	167	334 456	395	125.5	62.7
2. 23rd	{ 1st 2nd	12 19½	127 246	254 492	373	119.	59.5
$3. \begin{cases} 24 th \\ and \\ 25 th \end{cases}$	lst 2nd	91	103	206	214	68.	. 34.
4. \begin{cases} 25th and accept	] lst .	6	60	120	160	51.	25.5
5	{ lst 2nd	11 5½ 8	55 80	110 160	135	43.	22,5
					-		204.2
					Av	eraging,	41.

This table gives us then the daily and the average diameters of the circle sailed round on different days from North to South, or thereabouts. The following is the result when we begin with the time (8 p. m. 22d,) at which the vessel was running about North (NNE. by compass) and is thus a measurement from East to West; or at right angles to the preceding one.

preceding o	Hours.	elis Albert 107	Circle of	Dian	eter, Dist	from entre.
1st Turn,	1st half circle. 2nd	17 - 204 $18 - 202$	406		129.2	64.6
2d Turn,	1st 2nd	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	361.5	0.50	115.0	57.5
3d Turn,		11 — 112 5 8 — 81	193	**	61.4	30.7
4th Turn,	1st 2nd	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			49.6	24.8
5th Turn,	1st	8 — 80 8 — *80	160	• •	50.0	25.0
	The state of	A Block to				202.6
						40.5

The above averages it will be noted are derived from the run by Log.

There is a third average to be derived from the measurement, on the Diagram, of the distance between the parallels nearest to the longest, or vertical, or North and South diameters of each spiral on Fig II, which are those nearest the meridians. The transverse (minor) or East

<sup>\*</sup> This is incomplete: the log of the 27th closing, as before noted, at a West course, and the weather becoming fine; I have therefore supposed the latter half of the circle.



and West axes of the spirals, or those bounded by the nearest courses to the meridians appear at first sight to be reduced by the effect of the current, and the longer (major) axes also appear reduced by the crossings of the old track from the same cause, but the letters A to B, B to C, &c. and a to b, b to c, &c. will show the measurements taken, the first being near the meridional, the last near the horizontal distances. Measurements of these parallels are also taken, as in the former case, twice for each circle to obtain a fair average, and are for the vertical axes.

d ne				Mea	n Diame	ter.*	Mean distance from centre.
1st	$\begin{cases} 1st & A \\ 2nd & B \end{cases}$	to B	112 }	::	110	• • •	55
2nd -	lst C 2nd D	to D to E	85 }		123,5		61.7
3rd	lst E 2nd F	to F to G	77 }		75	::	37.5
4th	lst G 2nd H	to H to I	45 } 64 }	••	54.5		27.2
5th	lst I 2nd J	to J	61		54.		27
						Mea	n. 41.7

When the same kind of measurement is taken between the extreme meridians of the spirals, or from east to west, the results are as follows:

onows:—		Mean Diam.	listance from e centre.
1st Turn,	$\left\{\begin{array}{l} a \text{ to } b & 92 \\ b \text{ to } c & 182 \end{array}\right\} \dots$	137	 68.5
2nd Turn,	$\begin{cases} a \text{ to } b & 92 \\ b \text{ to } c & 182 \end{cases}$ $c \text{ to } d & 89 \\ d \text{ to } e & 146 \end{cases}$	117.5	 58.7
3rd Turn,	f to g 77	55	 25.0
4th Turn,	$\left\{\begin{array}{ll}g \text{ to }h & 35\\h \text{ to }i & 72\end{array}\right\}  \cdots$	53.5	 26.7
5th Turn,	$   \begin{cases}     e \text{ to } f & 33 \\     f \text{ to } g & 77   \end{cases} $ $   \begin{cases}     g \text{ to } h & 35 \\     h \text{ to } i & 72   \end{cases} $ $   \begin{cases}     i \text{ to } j & 28 \\     j \text{ to } k & *   \end{cases} $		178.9
			44.7

It is evident here that the second half circle is affected by the current which in the run during the first half is against the vessel, diminishing the breadth of the circle, and in the second half is in favor of, and increases it; making thus double the difference. .The average however singularly agrees with the others, as will appear in the following general table. \* Incomplete as in page 725, and the blank cannot be supplied here.



The following is the result of these various modes of estimating the diameters of the Circles, and the average distances from the centre during each revolution sailed by the Charles Heddle.

	By separate turns	Log	Log.	Diagram with correction for current, Fig. II.	on for current, Fig. II.
Revol Complete	Average.	By half turns, WNW. to ESE.	North to South.	By Meridional axes of By Horizontal axes of spirals.	By Horizontal axes of spirals.
ri de	Diam. Dist. from centre. 123 61.7 135 67.7	Diam. 125.5	Dist. f	Diam. Dist. f 110.	Diam. Dist. from centre. 137. 68.5 117.5 58.7
E S S	53.2 38.4 47.7 23.8	68.0 34.0 51.0 25.5 43.— 22.5	61.4 30.7 49.6 24.8 50.— 25.0	75. 37.5 54.5 27.2 54. 27.	55.0 25.0 53.5 26.7 Imperfect
Mean Average distance from		41.0	40.5	41.7	44.7
centre,		Mean of the whole by log is	42.0	Mean of the first two days by log is by chart,	est two days by log is 62.3  set 3 days by log is 27.9

By the whole distance run (p. 724,) and number of turns, the average distance from the centre on the whole five days is 45 miles.



We arrive so near to the same results by all these different modes of calculation, that we can entertain no reasonable doubt that they are not far from the truth, as shewn by the original data, and that the vessel made in round numbers

- 1. In the first two days, circles of about 125 miles in diameter, and was sailing round at an average distance of 61½ miles from their centre, the greatest distance being 68 and the least 57½ miles.
- 2. That for the last three days she was sailing round in circles of about 56 miles in diameter, and consequently at a distance of 28 miles from the centre, the greatest distance being 39 miles, and the least 25.

It appeared to me also interesting to know for how many hours during these five days each wind blew; so as to obtain an idea of what the total resultant curve of the winds was, independent of the run of the ship. I explain these terms. By the total resultant of the winds is meant in meteorology the calculating each separate wind during the number of hours it blows in a given time, its direction being in nautical language a course, and the time or number of hours a distance; the strength being always supposed the same (or this may also be used,) and all these courses and distances, (direction and time,) may make a traverse table, of which as usual one course and distance is the result. Thus if in 24 hours we have 9 hours of NE., and 15 of SW. wind, the resultant is 6 of SW. Wind; or the whole atmosphere of the place may be supposed to have moved for 6 hours to the N. E., if the strength of the two winds was always equal. This is the resultant of the wind. If instead of the traverse table we project the directions of the wind for courses, and the hours it blew for distances, we shall have a line of some kind, which in this case is a curve, and this is the resultant curve of the wind, Now in the run of a vessel scudding under bare poles her run per hour may be supposed to be an indication of the strength of the wind, but then, the course and distance shewn by log becomes the resultant, indicating from which quarter also the resultant wind blew, and this, as shewn already, is to the N. 42° E. by the log, Fig. I. It is true that the vessel being always carried to the SW. by the current shewn beyond doubt to have existed, this result is not so valuable as it might have been had no current existed, but it nevertheless has appeared to me to be one worth investigating, as giving an

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average of winds as prevailing along the track and close to the centre of the storm for the whole five days.

This summary then, is as follows, beginning with the log of the 22nd, 23rd, which is at Noon 22nd by Nautical time, and ending at Noon 27th. The winds being given by compass are corrected for 1½ point of Westerly variation, to enable the reader better to compare the curve with Figs. I. and II.

Winds.	I	Per lo	og •	Corrected			Trav	erse.	
of the unite		iours		for Var.		N.	S.	E.	W.
North*		8	Uni 95 a	NbW1W.		8.7	-1.		2.3
NNE.		4	4.70m	NIE.	***	4.0		0.4	
NE.		4		NNE E.		3.5	1	1.9	
ENE.		10	due of bill	NE1E.		6.3		7.7	
East,		7	STOLEN,	EbNiN.	***	2.0		6.7	
ESE.		4	THE PERSON	E1S.	Birth.		0.4	4.0	• •
SE.		6	Teleso I Qui	SEbE1E.	1000		2.8	5.3	
SSE.		10	He was	SE1S.	1000		7.7	6.3	100
South,		11	lar segming	SbE1E.		1.	10.5	3.2	
SSW.		7	e distanti b	SIW.	100		7.0		0.7
sw.		8	of the same	SSWIW.		H	7.1 .		3.8
wsw.		7		SWIW.		Helon	4.4		5.4
West.	***	9	Harry William	WbSis.			2.6		8.6
WNW.		10	THE PARTY	WIN.		1.0		TRA SHEET	10.0
NW.		8		NWbW1	W.	7.1	•		3.8
NNW.		7	Wand y	$NW_{\frac{1}{2}}N$ .		5.4			4.4
	6.3	120	hours, or	five days.		37.0	42.5 37.0	35.5	39.0 35.5
	41			the hitter of	Sou	ith.	5.5		3.5W.

Which gives as the resultant wind South  $32^{\circ}$  W. 6-5 (hours) in 120h. or  $\frac{2}{37}$  of the whole time or run, and as the run was in all 137 miles, this would give 74-4 miles, calculated in distance.

<sup>\*</sup> Nautical men will notice that the vessel is always marked as changing her course two points. I suppose she was steered as long as possible with the wind veering a little on the quarter and then the gradual alteration taken as an average, as is often done in cases of squalls of long duration obliging a ship to bear up. At p. 724 it will have been noted that 11 point per hour is the average change.

730

Now the course and distance made, corrected for \ N. 42. E. 111.

That shewn by the average wind is, S. 32° W. for N. 32. E. 74.4. 6.5 hour, or

the difference being occasioned by the varying distances made in the different times, arising from the varying strength of the wind, and the effect of the current. The result is always of great interest, for it proves that the vessel, to counteract the current, was obliged to run for one-tenth of the whole time, or ten hours extra in the SWbW. winds (S. 55° W.), and thus though it does not prove that the wind was less strong on the one side (the NW. side) of the storm circle than on the other, it shows that the current must have existed to a great extent.

The resultant curve made by the average of these different winds for the whole five days is also worth attention, and I have projected it in Fig. III. taking the hours for distances. If this, and Fig. IV. (which are on a larger scale than the other diagrams,) be considered attentively with them, we may, I think, without presumption say that, as they are the only Maps of the winds in such a hurricane yet traced out, so it will, I fear, be long before we obtain such another.

Its form is also that which theoretically we should say it would assume; for if we suppose a vortex of air of any size moving through the air (like a dust whirlwind) we should imagine it to be liable to be flattened in on the foremost, and elongated on the following side, and this ours evidently is. If we suppose that the vortex is not one of independent atoms of air moving forward, but of atoms in their usual places to which a rotatory motion was successively given, like the undulatory movements of particles of water, the same flattening might still occur, though to a smaller degree, and in a different part of the circle.

A somewhat different curve would be shewn by the number of hours of wind in the five days, with the distance run to each, as shewing the strength of the wind; the vessel being for the whole time under bare poles.\* The resultant of this which is projected at Fig. IV. will be that of the three elements, direction, time, and force, and it will also be the average of all the curves of Fig. I. The table is as follows,

<sup>\*</sup> And her resistance operating on a large scale like the counter-spring or weight, and friction of an Anemometer.



and I allow for it the same variation, 1½ point, as in Fig. III. the ¼ of a point more allowed during the last two days in the log making, as before shewn, no difference worth noting.

Table of the distance run with each wind.

	Winds per Log.		Hours.		Corrected for Var.	Di	stance run with that wind.
12	North,	4(45	8		NbW1W.		85
13	NNE.		4		NIE.		40
14	NE.		4		NNEIE.		43
15	NNE.	***	10	Detection .	NEIE.		111
16	East,		7	1	EbNiN.		87
1	ESE.		4		E1S.		57
2	SE.		6		SEbE1E.		65
3	SSE.		10		SEIS.		94
4	South,		11		SbE1E.		109
5	ssw.		7		S1 W,		77
6	sw.		8		SSW <sub>2</sub> W.		89
7	wsw.		7		SWIW.		75
8	West,		9		WbS12S.	**	100
9	WNW.		10		W1N.		101
10	NW.		8		NMPM <sup>7</sup> M		88
11	NNW.		7		NWIN.		71
			A STATE OF THE PARTY OF THE PAR	-			TIP.

There are farther considerations arising out of these results. We are much puzzled when we consider a vortex of air simply as whirling round and without any progressive motion, to say whether there would be a centrifugal or a centripetal tendency? or a mere circular one, throughout? or even centrifugal at the circumference and centripetal towards the centre?

The laws of physics would certainly indicate a centrifugal force, and we usually suppose then an attraction to counterbalance this; or again, the mind reverts to the apparently well observed and attested accounts of water spouts and whirlwinds, which all seem to lean to the fact of these small vortices, at least, having rather a centripetal than a centrifugal force; that is, a particle of air or dust in the neighbourhood would be drawn farther and farther inwards. Our present result is evidently to shew this sort of incurving, and the diameter of the storm was a decreasing one!



The consideration of Fig. III. in this point of view, leads I think to a practical result of some, or perhaps much importance; I consider it thus,

We see clearly that from X to Y in Fig III. and from x to y in Fig. IV. the whole tendency of the winds was to form a converging spiral, and not a diverging one, or in other words, a circle of which the wind-arrows would turn inwardly and not outwardly.\* Now we can have no manner of doubt I think that this storm was one of those which, as I have previously shewn, is really the case (See Journal, Vol. IX. Coringa hurricane) was contracting in its progress, and not dilating as many do.

Is it then the case that, when the storm contracts, the wind forms a converging spiral, and E CONTRA if it is a dilating storm, the spiral is a diverging one? We are induced to think this highly probable, and apart from the great interest of it to the meteorologist, if we find it to be the case, it becomes of high importance to the accuracy of our investigations, and moreover to the practical application of the Law of Storms for the purposes of the Mariner; and it is so from the influence which it has on the true bearing of the centre.

An example will best shew this.

If we suppose a contracting storm, i. e. one which has a tendency to diminish in size as it proceeds, of 320 miles in circumference, each arc from point to point of the compass of such a circle will have a chord of something less than ten miles; across which we may supposed a scudding ship to run with one wind till it suddenly or gradually changes to another. But according to the hypothesis that the contracting storms are composed of winds converging to the centre, and not of arcs of a complete circle, we may suppose that each of these thirty-two winds and the corresponding chords of their arcs, which are the ship's courses, are also, not perpendiculars to a radius from the common centre, like true tangents, but to the radii from a succession of centres, which are disposed round the common centre; in a word, that they converge inwardly also, like the windsarrows on our charts.

In the Northern hemisphere they will probably converge inwardly to the left. In the Southern hemisphere to the right? How much do they converge is the next question? for its reply will give us this datum. The allowance we should make to ascertain the true bearing of the centre in projecting, and even in estimating its position at sea.

\* Our figure approaches to the volute of an Ionic capital.



It may be possible to estimate this; approximately at least.

Let us take our circle of 320 miles, and consider the chords of the wind arcs in a true circle as forming a polygon of 32 sides, or points.

Now in our Fig. III. the amount of incurving at the two points is about seven miles for an average circle, say, of forty five miles.

The diameter of our circle of 320 miles is (in round numbers always) 102 miles, so that, at this rate of incurving, we may say that the total would be in the same proportion, sixteen; i. e. 45:7:102:16.

Now sixteen for 32 points is exactly half a mile for each point, and the chord of each arc of one point is 10-5. An incurving of half a mile in such an arc would give about 5°, or say half a point.

In a circle of 200 miles in diameter, on which a ship would only be at 100 miles from the centre (at which time in our Bay of Bengal and China Sea Hurricanes a storm is usually fully and unequivocally manifest) the whole incurving would be thirty miles; let us say thirty-two, or a mile for each point.

Now the incurving of a mile to each point would make a difference on each arc of about 3° only in the direction of the chord, or say a quarter of a point: so that here it would not make much difference. But we may suppose that the incurving is double what we have here assumed, or even more;\* and then the difference as to the bearing of the centre might be a point, i. e. a vessel in the Northern hemisphere with a hurricane commencing at East, would have the centre bearing, not South but SbE. from her; and if we suppose this on a circle of 320 miles circumference as before, this would for our purposes, in protracting the winds and ship's place for the centre, make it rather more than 10 miles to the Eastward of its situation if there was no incurving; and if we again estimated this centre by the cross bearing from the winds of another ship on the Eastern edge of the same circle having the wind at South and the centre supposed to bear (without allowance for incurving) West, it would really bear with this allowance of the incurving WbS. and the position found by these allowances for the incurving winds would be 14 miles to the SE. of that shown without it!

I think this may often account for many of the discrepancies we have found in reconciling the ship's positions, winds, and bearings of the centre.

<sup>\*</sup> Is the rate of veering of the winds (in this case, see p. 724, 13 point per hour) any index to the amount of incurving?

At present it is of course a mere theory, but the fact on which it is based, viz., the average incurving tendency of the winds in the Charles Heddle's storm seems fairly enough elicited, and to call for close attention.

Like all theories it will serve us as a torch and a partial guide for the present, and we must wait for more facts, to show if it be well founded.\*

If (for the sake of hypothesis only) we admit this incurving of the winds, it follows that there may be also, not a single incurving of the same rate throughout the whole breadth of the storm, but that the incurving may be much more excessive, and amount to two or three points when the centre is nearly approached, and even be so violent at the centre as to prevent ships drifting out of it? just like the vortex of a whirlpool or a tide-eddy, which last we know will often give a boat's crew a heavy pull, or a ship much trouble, before they get out of them. Does it not seem that we have here the explanation of how some ships, as in the case of the Runnimede and Briton in my last memoir, may be blown and drifted round and round, without drifting out of the fatal centre, which we should look for them, nautically, to do, and which other ships there is no doubt really do. An excessive incurving of the winds towards the centre, like the wind-arrows at the centres of Fig. 111. and IV. is one, and one very likely method of accounting for vessels remaining in this hopeless state, and moreover it may assist us in supposing how some dismal losses have occurred whilst other ships in company have escaped. It adds also a most powerful argument, if any were wanting, for every precaution to avoid the centres-and for every one who can contribute to these researches to do so.

It is possible that at some periods of a storm, the state of it may be such that there is a centrifugal tendency at the circumference, and an incurving or centripetal tendency near the centre, and thatat some point in the whole zone of the storm the winds are blowing in a true circle? All this is matter of high interest to us, and for future careful research. I have perhaps been prolix in this section, but if I have been so, I trust it will be attributed to my anxious desire

<sup>#</sup> I may notice here, that in my Third Memoir, Journal As. Society, vol. ix. p. 1047, in noticing the anomaly of the George and Mary's log, I have suggested theoretically that the storm might have divided. We have since abundant proof, that this frequently occurs in the Bay of Bengal, as seen in succeeding memoirs.

to urge the subject on the minds of others, and to elicit their views as well as my own.

### Conclusion.

Every man and every set of men who are pursuing the investigation of any great question, are apt to overrate its importance; and perhaps I shall only excite a smile when I say, that the day will yet come when ships will be sent out to investigate the nature and course of storms and hurricanes, as they are now sent out to reach the poles or to survey pestilential coasts, or on any other scientific service; and it is be hoped that England will in this, as in every other nautical investigation, take the lead, and that without waiting till some astounding misfortune shall Nothing indeed can more clearly force the investigation upon us. shew how this may, with a well appointed and managed vessel be done in perfect safety, than the experiment which the foregoing pages detail; performed by mere chance, by a fast sailing colonial brig, manned only as a bullock trader, but capitally officered, and developing for the seaman and meteorologist a view of what we may almost call the internal phœnomena of the winds and waves in a hurricane, -and these as mathematically proved as the nature of things will allow,-which we could scarcely have hoped ever to have obtained. The importance of the questions which arise when storms are considered in any of their relations, in war or in peace, to a great Naval and Commercial Nation, and to mankind in general, cannot I think now be doubted.\*

<sup>\*</sup> While correcting this page for the press, we receive an account in the Newspapers of the dismal catastrophe of the loss of the Emigrant ship Cataraqui, at the entrance of Bass' Straits, in which 414 souls have perished in the prime of life! This vessel was evidently on the Northern side of a rotatory gale, and swept, in all human probability, by the storm wave, as in the analogous cases in the British Channel, far to the Eastward of any supposed possible drift.

736 Account of the Esafzai-Affghans inhabiting Sama (the plains,) Swat, Bunher and the Chamla valley, being a detail of their clans, villages, chiefs and force, and the tribute they pay to the Sikhs. By Shekh Khash Alee, a follower of the fanatic Synd Ahmed. Prepared in 1837 under the instructions of Major R. Leech, C. B. Late Political Agent, Candahar.

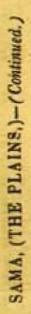
[ Norg. - In Conolly's notes on the Eusofzye tribes of Affghanistan, Journal Asiatic Society, No. 105, 1840, page 932, it will be seen from the conclusion of the above paper, that it was but the intended commencement of a series; his object being to follow it up with a narrative of his journey in the Eusofaye country in January 1640. Will no one consent to supply what he has left incomplete?

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SAMA, (THE PLAINS.)-(Continued.)

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	Account of the Esafzai-Affghans, &c. [No. 166.
Amount of annual tri- bute paid to the Sikhs.	3,000 Rs.
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SIRDAR FUTTEH KHAN. - (Continued.)



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# SIRDAR FUTTEH KHAN .- (Continued.)

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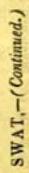
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Report of a Trial for Rebellion, held at Moulmein by the Commissioner of Tenasserim. Communicated by the Sudder Dewanny Adawlut. With a plate.

## GOVERNMENT

versus.

NAG PAYN AND 20 OTHERS.

Charge-Rebellion attended with Murder.

This trial came on before the commissioner of the Tenasserim Provinces at the sessions for the month of February 1844.

The prisoners pleaded not guilty to the following charge:

1. Nga Pyan, ..... Prisoner.

CHARGE.

1st. In having, during the month of May 1843, unlawfully assembled men for purposes treasonable to the state, and subversive of the public tranquillity.

2ndly. In having, on the 15th of the same month, unlawfully resisted with arms the officers of the Government, thereby causing bloodshed.

3rdly. In having been concerned as accessary in the wilful murder of Nga Kaloo, on the 15th May 1843.

### PRISONERS.

1. Nga Shoay Loo,

2. Nga Shoay Moung,

3. Nga Dot,

4. Nga Shoay Pho,

5. Nga Yee,

6. Nga Pathee,

7. Nga Daray,

8. Nga Pok,

9. Nga Han,

10. Nga Nyaik,

11. Nga Shoay Koo, .

12. Nga Wey,

13. Nga Oung Meng,

14. Nga Dok,

15. Nga, Mhwe,

16. Nga Shoay Too,

17. Nga Shoay Go,

28. Nga Kyee,

19. Nga KyauGoung,

20. Nga Mhe.

### CHARGE

1st. For having, during May 1843, unlawfully joined Nga Pyan for purposes treasonable to the state, and subversive of the public tranquillity. 1844. July 19.

Case of NGA PYAN and 20 others.

In a trial for rebellion in the Tenasserim Provinces, in which one life was lost, the Court, at the recommendation of the comissioner, who although he had recorded a sen-tence of death against him, proposed a mitigation of the punishment, sentenced the ringleader to imprisonment for life in the local jail, as a better warning to others than imprisonment with transportion beyond seas; and the remaining prisoners to periods of imprisonment with labor and irons, vary-ing according to their several degrees of guilt.

[No. 166.

1844. July 19.

Case of NGA PYAN and 20 others. 2ndly. In having, on the 15th of the same month, unlawfully resisted with arms the officers of Government, thereby causing bloodshed.

3rdly. For having been concerned as accessaries in the wilful murder of Nga Kaloo on the 15th of May 1843.

The origin and scene of the disturbances for which the prisoners were tried, were thus described in the letter of reference accompanying the proceedings.

"The insurrectionary movement which gave rise to the trial, was discovered in May 1843, very suddenly, and just at the moment of the intended outbreak. At first, every person denied knowledge of the affair; but enquiry soon showed that it was well known to the Buddhist population of every rank, and that the leader, Nga Pyan, had long been becoming famous for sanctity, which, in these countries, is a necessary introduction to political power, for there is no priesthood in our sense of the word. Those whom we call priests are monks bound by temporary vows, seeking knowledge or their own individual subsistence. The civil magistrate is the real priest, being at the head of the nation taken as a religious as well as a civil community; -thence every Buddhist dynasty has been founded by religious fanatics, or impostors, having military talent,-and the reigning families always claim special powers from heaven. Religious ascetics and fanatics are therefore jealously watched, and put down with a strong hand when their followers become numerous, especially at the periods marked in their prophecies, or, in popular belief, as those in which great changes may be looked for. Such a period is the present, as will be seen from the proceedings.

"The time chosen was judicious—he was to meet his followers from all parts of the country at Gyne, two days' journey from this, thence he was to come down to the White Pagoda, close to Maulmein, and declare against the English. This was to happen at the begin-



ning of the rains when the country becomes impassable for troops, and he would have been master of the upper country during the rains—which would have produced a great effect on the people both here and in the Burmese territory, where also the people were much excited.

"Captain McLeod, my principal assistant, was despatched at once with a party of the local corps to Daloung, near the Siamese frontier, where Nga Pyan was; and the civil charge (revenue excepted) of that part of the country was also temporarily given him; at the same time the local native officers of districts and villages were called on to arm a portion of the inhabitants, there being reason to suspect most of them of being implicated. The suspicions were made known, with a promise of no further enquiry in case of zeal.

" Forced marches brought Captain McLeod up just in time to meet Nga Pyan as he was leaving the Pagoda, where he had performed the ascetic devotions required, according to popular belief, in founders of dynasties. He was proceeding to Gyne, where the people were at that moment assembling from all parts with arms. The trial details the proceedings-a party under the native magistrate of the district (Moung Gyaing, the Goung Gyouk) ordered Nga Pyan and his people, who were in canoes, to stop and give themselves up, but they refused, and a skirmish followed, in which a few of Nga Pyan's people were killed or wounded, and one man of the Government party was slain. Nga Pyan fled, but by great energy and zeal, and conciliation on the part of Captain McLeod, the Karens, who inhabit those districts and had all joined Nga Pyan, were led to confide " in a promise of perfect amnesty if they prevented the flight of the insurgent party-very large rewards were at the same time offered, as far as rupees 1000, for Nga Pyan himself, and eventually nearly all the leaders were secured. At the same time the native servants of Government were assured of forgiveness.

1844. July 19.

Case of NGA PYAN and 20 others.



Case of NGA PYAN and 20 others.

"In pursuance of these promises the inquiries, at least those judicially made, have been limited to what sufficed for the conviction of the prisoners. It will be seen that Nga Pyan first gained influence by works of religious merit; that he raised funds enough to build a number of Pagodas, and that during the prevalence of the cholera, people flocked to him for safety, trusting to his miraculous powers. Over the place where he sat at the White Pagoda, was hung one of the Burmese religious paintings setting forth his religious visions, and the superior beings indicating to him the site and the form of the Pagodas he was to build. This painting accompanies the proceedings, (See Plate.) The Pagodas are actually similar to those represented, save the gilding, which is not completed; but a great number of others, of smaller size, were built or begun all around them, by subscription of persons who had become Nga Pyan's disciples. It is the custom to fill the centre of them with images of Godama, bearing the name of the donor, and it was the names on these which enabled me first to obtain a good clue to the affair-a few of these, out of many hundreds, are also forwarded.

"The proceedings show how all this was directed beyond mere superstition. The people were by the reading and expounding of prophecies, led to look for the revival of a national dynasty of this country (Pegu) in the Burmese year 1206, the present year—and the future ruler was to be the person who should put the zee, or umbrella-shaped ornament on the new Pagodas—for the ordinary magistrate was not to do this. On the time approaching, it will be seen, Nga Pyan retired to Daloung with a few of his own devoted followers, to practise the austerities usual in such cases,—he seized the traders moving through the country, and made them swear allegiance, and before proceeding to the rendezvous at Gyne, learning that a part of the local corps was despatched against him, he issued the proclamations

# Report of a Trial for Rebellion, at Moulmein.

given in the proceedings, calling on them to give up their arms and join him. These proclamations\* are in the form used only by the King of Ava, and never by a subject. He also assumed in all respects the titles of royalty, and set up the black flag which in these coun-

1845.]

1844. July 19.

Case of NGA PYAN and 20 others.

### \* TRANSLATION No. 1.

If your soldiers, knowing that (this) victory-flag-order has been placed, Friday, the 13th of the waxing of Kah-zong, 1206 (a) (May 11th 1843,) still presume to make forcible entrance, I, the golden personage, am possessed of the golden tsah-kyah bow, the gift of the celestial king, and I am possessed also of the tsah-kyah sword.

According to the ancient custom of dynasty-founders, sovereigns only ought to engage in combat. You (the inferior pronoun, equivalent to you fellows) and I (the superior pronoun, equivalent to Lord I) are not on a par, in point of glory and destiny. If I bind my golden tsah-kyah bow, I fear that death and destruction will come upon (many) creatures, and therefore I place (this) victory-flag-order.

A royal order from the sovereign lord of Da-mu-tsah-kyah.

### TRANSLATION No. 2.

The sovereign of the four grand continents, the most glorious lord of the tsad-dan, white elephant, master of the aring-da-mah tsah-kyah spear, owner of the ma-nan-ma-yah gem, radiant in benevolence and power, (as) effulgence bursting from the summit of Myenmo,—power to reign over the four continents—issues a royal order:

Ho! all ye soldiers, who come marching from afar unto the victory flag, which I have set, Friday, the 13th of the waxing of Kahzong, 1206, (May 11th 1843)! That I may easily ascertain, whether you will deliver up your lives, and become my own servants or not; ye are to come by ones and twos, and lay down your arms and do me homage.

A royal order from Lord Da-mu-tsah-kyah. (b)

When the oath was administered by Nga Pyan, the royal words were thus recited:—The most excellent master of land and sea, lord of the tsah-dan, white elephant, master of the tsah-kyah weapon, Da-nu-ra-jah-men (king Da-nu) declares, that, whereas our subjects, the common people, are now in a poor and suffering state; the towns and villages shall, under my reign, be so taken care of that they (the common people) shall be quiet and happy. Which being read, the oath was administered.

Testimony given before the magistrate.

Moung Tan-Laye. (A true translation,)

(Signed) A. Judson,

(a) Evidently anachronistic.

(b) Da-mu is Pali, and signifies bow. In the first order, he is styled Lord of the tsah-kyah bow—and in the second, Lord tsah-kyah bow.

1844. July 19.

Case of NGA PYAN and 20 others. tries is understood to indicate a resolution to subvert the Government de facto. It is as proverbial in this sense here as to indicate pirates among European nations.

The prisoner No. 10, Nga Han, being sick was not tried; and No. 11, Nga Nyaik was acquitted. The prisoners No. 8, Nga Dairay, and No. 15, Nga Dok, were convicted on the 1st count, and acquitted on the 2d, and sentenced by the commissioner, Major Broadfoot, to be imprisoned for seven years from the 1st June 1844; no mention was made of the 3d count. The commissioner convicted all the other prisoners, and recorded against them a sentence of death; but, in his letter of reference, he recommended the following remissions of the extreme penalty of the law.

To the prisoner No. 1, Nga Pyan, as the ringleader, he said he had held out no hope of any commutation of the sentence. Had no life been lost, he should have recommended that even this person should be sentenced merely to imprisonment for life; but, as arms were resorted to, he refrained from recommending any mitigation, leaving the matter entirely in the hands of the Court. In the 17th\* paragraph of his letter however, he evidently leaned to the opinion, that justice would be satisfied, and that policy required a commutation of a sentence of death to one of imprisonment for life.

The prisoners Nga Shoay Loo, No. 2, and Nga Shoay Koo, No. 12, as influential and dangerous persons, not

\* 17th Para—" I beg further to recommend that the sentences date from the 1st of July 1843, by which time all were apprehended—and finally I subjoin the reasons referred to above for having, in a case of offence so serious, and so nearly producing very calamitous results, recommended punishment so lenient.

"1st.—The superstitious and national feelings of the people were strongly appealed to; and leniency lessens the chance of the criminals being looked on as martyrs; indeed, in this case, will destroy it. I believe if Nga Pyan be imprisoned for life, and the others punished as above recommended, the general feeling will be that mercy has been extreme, which is always the safer where the Government is concerned.



instigated by superstition as the others, but by the desire of exciting a disturbance, with a view to profit by it; and as having been in Nga Pyan's confidence, he proposed to sentence to imprisonment with labor for 14 years.

1844. July 19.

Case of NGA PYAN and 20 others.

The next in activity, No. 3, Nga Shoay Moung, No. 16, Nga Mhwe, No. 18, Nga Shoay Go, and No. 19, Nga Kyee, he proposed should be sentenced to imprisonment for 10 years with labor,—unless the Court should think the fact of Nos. 18 and 19 being brothers of Nga Pyan, and men above the average incapacity and resolution, required a longer period of imprisonment.

The rest (with the exception of Nos. 13 and 21, whom he proposed to imprison for two years each,) he recommended should be imprisoned for five years with labor, viz. Nos. 4, 5, 6, 7, 9, 14, 17 and 20.

Why the commissioner sentenced Nos. 8 and 15, who were convicted on only the 1st count, to seven years, while he proposed to sentence those mentioned above to five and two years, was not apparent.

The case in the Nizamut Adawlut was laid before Mr. Reid, who, under all the circumstances of the case, concurred with the commissioner in convicting the prisoners as above recorded. For the reasons stated in the 17th paragraph of the commissioner's letter, he did not think it would be expedient to sentence the prisoner Nga Pyan to suffer death, and accordingly sentenced him to be imprisoned for life. Transportation beyond seas was not added, because imprisonment among those whom he attempted to seduce from their allegiance was deemed a more proper sunishment. The prisoners Nga Shoay Loo, No. 2, and Nga Shoay Koo, No. 12, were sentenced to imprisonment with labor in irons for fourteen (14) years; Nga Shoay Moung, No. 3, Nga Mhwe, No. 16. Nga Shoay Go, No. 18, and Nga Kyee, No. 19, to imprisonment with labor in irons for ten (10) years; and the prisoners Nga Dot, No. 4, Nga Shoay Pho, No. 5,



1844. July 19.

Case of NGA Pyan and 20 others. Nga Yee, No. 6, Nga Pathee, No. 7, Nga Pok, No. 9, Nga Oung Meng. No. 14, Nga Shoay Too, No. 17, and Nag Kyan Goung, No. 20, to the same for five (5) years. The sentence of seven (7) years' imprisonment passed by the commissioner on Nga Daray, No. 8, and Nga Dok, No. 15, was annulled, and they were sentenced each to be imprisoned, with labor in irons, for five (5) years. Nga Wey, No. 13, and Nga Mhe, No. 21, were sentenced to be imprisoned, with labor in irons, for two (2) years. The sentences of temporary imprisonment were ordered to commence, as recommended by the commissioner, from the 1st July 1843.

In regard to the prisoner Nga Han, No. 10, whose trial was not completed in consequence of his sickness, the commissioner was directed to use his discretion, and either conclude the trial against him, or hold him to bail for his future good conduct.

NOTE.—The banner represented in the accompanying lithograph has been copied with care from the original, deposited by the sauction of the Sudder Judges in the Society's Museum.—Ens.

Memorandum on the Iron Works of Beerbhoom. By Welby Jackson, Esq., C. S. forwarded with specimens for the Museum of Economic Geology.

SIR,—I send with this letter several specimens of the iron ore of Zillah Beerbhoom; which it may perhaps be worth while to examine, in order to ascertain its value, and the nature and proportion of its ingredients.

This ore is now worked in the vicinity of Seory in Beerbhoom; but the manner of working and smelting it is so rude, that I have little doubt much of the iron is left in the refuse; if railways are established, the demand for the iron of Beerbhoom may be greatly in.

creased, more particularly as the ore is found at no very great distance from two of the most probable lines of railway, those between Calcutta and Rajmahal, and between Calcutta and Benares or Mirzapore.

The soil of the whole of the vicinity of Seory consists of ironstone, but the work is chiefly carried on at Deocha, which is marked in Rennell; also at Bharcata, Damra and Goonpore; it is found in these places, and is also brought from Sibperbaree, and other places in the Pergunnah Mullarpore; all to the north, a little east of Seory, the Sudder Station of Zillah Beerbhoom.

The ore is I believe argillaceous iron ore; no flux is used in smelting it, which is done entirely with wood charcoal; a manner of working which may have a good effect on the produce, which is said to be of good quality; but it must be very expensive, and the progress of the work is gradually destroying the fuel in the vicinity; it is smelted twice in circular kilns, the ore being taken out in a mass from the bottom. I send specimens of the iron after the first, and after the second smelting, also of the refuse of each burning; each smelting occupies four days and nights; and I am informed, produces 25 mds. of iron, at a cost of 17 rupees from each kiln; there are about 30 kilns, each of which pays one rupee for each smelting to the farmer of the Loha Muhal, who claims a monopoly of the iron manufacture; the iron thus produced, is sold for I rupee a maund to the refiners, who again pay six pie per maund to the monopolist. I understand the iron produced is of very good quality.

It is common, I believe, to find limestone and coal in the vicinity of iron ore of this description: no limestone has yet been found in Zillah Beerbhoom, but the country has not been well examined; coal is found in abundance near the river Dumoodar, about seventy miles off; the want of limestone, the usual flux, is a serious difficulty, and it would be worth while to examine the country to the north of Seory, as far as the foot of the range of hills which runs out from the Ganges at Rajmahal towards Deogurh, perhaps coal might be found

It is rather an argillaceous iron-ore matrix, with brown hæmatite and small, semi-crystallised nodules of magnetic iron-ore; called, according to the labels, Beej pathur (seed stones,) and from these last the iron is said to be made; but the mixture of the hæmatite and the magnetic ore would give very fine iron.—Cur. Mus. Econ. Geology.

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nearer the place where the works are now carried on; the only lime procurable is made from the common kunkur.

The circumstance of a monopoly of the iron manufacture existing in Zillah Beerbhoom is curious; I spoke to the agent of the monopolist on the subject; it seems he claims and exercises the monopoly throughout what was formerly the Zemindaree of the Rajah of Beerbhoom, which is by far the greater portion of the whole Zillah; the Rajah no longer holds the Zemindaree, which has been divided and sold; the monopoly is said to have been purchased at a revenue sale, and to have been acknowledged by a decision of the Sudder Court. I was enquiring more carefully into this subject, but was obliged suddenly to leave the district; I am much inclined to doubt the right claimed, but have not yet seen the documents on which it is grounded. I cannot conceive how such a right can have originated.

WELBY JACKSON.

Account of certain Agate Splinters found in the clay stratum bordering the river Narbudda, with specimens accompanying. By Capt. J. Abbott, late Assistant in Nimaur.

MY DEAR SIR.—May I claim the favor of your attention to a singular phenomenon exhibited by the clay and kunkur strata, bordering the river Narbudda.

- The valley of this river in Nimaur is a basin of black trap rock, perforated occasionally by peaks of granite. Upon the trap, is usually found a bed of clay twenty feet in depth, rendered barren by an admixture of sand and lime. Upon this bed is imposed black or an iron-brown soil, from half a foot to three feet in depth, composed almost exclusively of the debris of decayed, and the charcoal of burnt vegetation. Masses of trap (occasionally basaltic) break through these strata, and large hollow nodules of quartz filled with white or with amethystine crystals are found scattered over the surface; but more commonly in those portions of the valley which owing to superior height or other peculiarities, have no covering of clay nor of vegetable soil.
- 3. Along the Narbudda's brink, the black soil has been generally abraded by the torrents, leaving barren ravines of clay and kunkur,



the section of which is yearly exposed as the surface crumbles. kunkur in this bed is scattered through the thickness of the soil, with little visible stratification; existing there in small drops of the size of pocket-pistol bullets, which being found collected in the rocky beds of torrents, are used as gravel for garden walks.

- 4. As the cliffs of clay aforesaid crumble away, fragments of agate, milk-white, pellucid or streaked, are brought to light, sown equally through their substance; not as complete pebbles occasionally fractured or chipped, but universally as fragments, such as might be shivered from pebbles placed between an anvil and a sledge-hammer; about half of the specimens which I happen to have preserved, accompany this letter. They are faithful samples of the general appearance of this mineral in the clay stratum. It will be observed that the surface is always uncorroded, so that they must have been shivered in their present position as parts of a clay-bed twenty feet in depth; or more probably, immediately previous to their present location: for, all agates acquire a milky crust by long exposure to the action of the elements. They are found in abundance at the foot of all the clay cliffs, and may be picked out of the strata on ascending. I have seldom if ever found a complete series of fragments constituting a pebble: whence I would argue, that they were shattered previous to being involved in the clay. They are the only stones,\* occurring in this bed, and I have never found one of them unshattered, although there are abundance such in the river bed close by, and the trap rock is full of perfect agate pebbles.
- 5. You will observe how violent and decided must have been the concussion, to shiver so hard a stone into splinters so sharp and slender; an application of force, known in Nature at present only at the foot of water-falls having a shallow basin, or upon any rocky ledge at the base of a volcano. Were the fragments found in such a position, the projection upon their original masses of other rocks, might have sufficed to strike them off; but the clay matrix in which they are involved, would have preserved agates unshattered beneath the fall of mountains.

<sup>\*</sup> The river channel contains agates, rolled masses of jasper, porphyry, sandstone and limestone. The soil around has few stones excepting boulders of trap and nodules of white quartz.

6. As we believe the trap to be less ancient than the granite beneath it, so we naturally conclude the clay stratum to be less ancient than the trap upon which it rests, and which otherwise must have submerged it. The agate pebbles seem evidently to belong to the trap formation, in the solid substance of which they prevail in such numbers as occasionally to give it the appearance of pudding The convulsion which shattered the agates under consideration must have happened after the deposit of the trap strata, but I think previous to the deposit of the clay bed, the first soil sprinkled over the rocky surface. Whilst the valley was still a basin of naked trap, the fall or rolling together of rocks might shatter even the solid substance of agate. But this effect could be produced under water, only I think at the foot of water-falls. And, that every agate of a stratum, twenty feet in depth and many miles in area, should have been subjected to this action, seems improbable. The very clay itself belongs not to the formation upon which it rests; but has been wafted hither from mountains probably hundreds of miles distant, and thus mixed up with the agates, by some deluge of a very extensive character. And the appearance of these splinters of agate might lead conjecture to regard the primitive soils of our earth, as ground from the living rock, rather by some brief but most violent convulsion of the elements, than by the gradual and equable action of an ocean, in a succession of ages.

7. With such speculations all Geologists are familiar; yet every fresh illustration seems worthy of attention; and it is perhaps seldom that we have so clear an evidence of the action of secondary forces in an interval so remote as that separating the formation of the trap layers from the era of the clay deposit.

J. Аввотт.

4, Ballard's Buildings, 1st Sept. 1845.



Notes, chiefly Geological, across Southern India from Pondicherry, Lat. N. 11° 56', to Beypoor, in Lat. N. 11° 12', through the great Gap of Palphautcherry. By Captain Newbold, F.R.S., M.N.I., Assistant Commissioner, Kurnool. No. III., with a plate.

At Pondicherry, the soil on the surface is sandy; but the subsoil consists of a blackish stiff clay imbedding existing pelagic shells. A well lately dug near the factory of M. Buirette, exhibits the layers according to the diagram below.

Immediately to the west of the city the land gently rises into the low eminences called the Red Hills, which are intersected by numerous small ravines; and rugged with inequalities of surface.

In the valley and rising ground between them and the village of Trivicary, about sixteen miles westerly from Pondicherry, are the Neocomian beds of limestone, and near Trivicary itself, the celebrated fossil wood deposit which has been described elsewhere. The principal shell limestone localities are in the vicinity of the villages of Sydapett, Carassoo, Coolypett and Vurdavoor.

Trivicary.—At Trivicary the granite and hornblende schist are again seen, and also at Belpoor, or Vellapur, the kusbah of a taluk of this name in South Arcot, twenty-four miles westerly from Pondicherry. These rocks are penetrated by trap; and on them rest in little disturbed stratification, the Neocomian limestone beds, which support, like the nummulitic limestone of Egppt, beds of loose sandstone entombing the large silicified trunks of both dicotyledonous and monocotyledonous trees, the former being by far the most abundant both in the Egyptian Desert, and likewise at Trivicary. In both cases no beds of soil in which the trees formerly grew, no Dirt bed, as in the Portland fossil forest, in which the roots and stems stand erect as they grow, could be traced; nothing but the bare calcareous beds of the ancient cretaceous and nummuliferous oceans in which they were severally deposited.

Belpoor.—The face of the country between Trivicary and Belpoor is rough, with ravines and water courses; with surface blocks and bosses of granite and hornblende schists. These rocks are covered in one or two localities by patches of laterite, and support a sandy soil; which, in the vicinity of Belpoor, assumes the character of a tolerably fertile loam, producing Indigo, Rice, Tobacco, Raggi, Bajra, Culti, &c.



A bed of red clay, coarse sand, or the gravelly detritus of the subjacent rock, often form a subsoil of considerable thickness. Water is found at depths of from twelve to fourteen feet, and of excellent quality; efflorescences either of common salt, or carbonate of soda on the surface soils are rare.

The town appears populous and thriving, and contains about 500 houses, inhabited principally by cloth merchants, and cultivators (Kongyes). Near it lie the ruins of an old Jain temple. Two of its mutilated images stand at the Traveller's bungalow gateway, with their faces turned towards the pillars.

Large equestrian statues of Ayanar, constructed of brick and chunam, are scattered about this and other portions of the ancient Hindoo kingdom of Dravida, in the country of the Tamuls. I do not recollect seeing these statues in my travels through the ancient regions of Andhra, Karnata, or Maharashtra, whose boundaries are even to the present day marked by their wernacular languages, viz. Telinghi, Canarese and Mahratta.

These statues are not frequently colossal, and generally stand in the open air near pagodas or in sacred groves.

Wulundoorpet.—This village lies about twenty-nine and a half miles SW. from Belpoor. The aspect of the surrounding country is almost unbroken by elevations, covered with a sandy soil, and angular quartzy gravel, through which the subjacent rock, viz. hornblende schist, and gneiss, occasionally jut out in almost vertical laminæ, with a general direction towards the SW., and the dip towards the SE. The gneiss is often curiously contorted, and passes by weathering into a loose micaceous grit, which being washed away, leaves gaps in the continuation of its bed. The gneiss alternates with the hornblende schists, which often appears in thin layers conforming to the general direction and dip of the strata.

These focks are penetrated by veins of a prophyritic granite, consisting principally, like that at Permacoil, of reddish felspar, with adularia, and but little mica. The last mineral and hornblende in foliated crystals are seen aggregated in nests in the gneiss with pyrites; and chlorite appears as a dull green earth in cavities; sometimes these minerals are entirely wanting. The conditions under which they as well as other minerals are subject to this state of segregation, and



again of equable diffusion throughout the entire mass of rock, are matter of interesting enquiry. It is a well known fact, that heat under fusion will contribute to the concentration of particles of copper ore diffused through a matrix, and it seems probable these effects in the hypogene rocks have been produced during their subjection to metamorphic heat and crystallization.

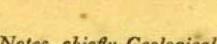
Foliated garnet and reddish felspar occur in the more quartzy parts of the gneiss.

In the steps of a large well in front of the Traveller's bungalow, are a few blocks of a gritty sandstone, resembling the more concolidated portions of the loose sandstone imbedding silicified wood at Trivicary. It was marked with brick red, and ochre yellow, having bands. It is said to have been quarried about two miles off, and also to occur near Verdachelum. This led me to infer the possibility of the extension of the fossiliferous beds of Pondicherry in this direction, an inference subsequently verified by Mr. Kaye, of the Madras civil service, (Vide Madras Journal for June 1844.)

The limestone in which the Verdachelum fossils are imbedded, resembles more that of the Trichinopoly beds, and the pelagic shells it contains are supposed to be of a rather more recent epoch than the Neocomien, or lower cretaceous series of Pondicherry, but this is a point not yet quite settled by the present talented Secretary of the Geological Society, Professor Forbes. The limestone was found to be associated with beds of an overlying sandstone, imbedding silicified wood, precisely resembling that of Trivicary and Pondicherry. These beds, I have little doubt were once continuous.

It is a point of much importance to ascertain the fact of the limestone beds being continuous or note or whether the Pondicherry beds
occupy a lower place in the order of superposition than those of Verdachelum and Trichinopoly. The Verdachelum beds lie between
Paroor, a village about seven miles WNW. from Verdachelum and
the town of Verdachelum itself, which lies about twelve miles S. by E.
from Wallundoorpett. If the account given me by the natives be
true, the sandstone beds extend to within two miles of Wallundoorpett. The boiling point of water gives the plain at Wallundoorpett
but little elevation, if any, above the surface of the sea.

A lunar halo occurred here, the radius of which I found to measure 21° 30', sky hazy, slight sensible depression of the thermometer 2°.



The superstratum of soil is sandy, frequently entirely composed of sand, some of which has doubtless been washed from, or forms part of the sandstone and silicified wood beds. In other parts a rich greyish clayey loam, mixed with a portion of lime, occurs, yielding fine crops. Staple articles of cultivation are similar to those of the last village. Kunker is occasionally met with in surface nodules, and as a substratum. The water is sometimes brackish here.

Wallundoorpett was once a place of some note under a Poligar, but now dwindled into insignificance. A sulphuriferous earth is said by natives to exist in the Wodiapolium jungle near Womaloor, a few miles south of this, occurring in the bed of a swamp, about half a mile in extent. Specimens were sent me by Mr. Fischer of Salem. The soil is of a greyish colour, friable, and the sulphur occurs in small crystals and impure nodules distributed through the soil.

Chinna Salem.—The country between this and Wallundoorpett is an undulating plain. On approaching Chinna Salem, which is about twenty-six and a half miles W. from Wallundoorpett, and fifty-five miles direct distance from the coast at Cuddalore, a chain of lofty hills with undulating ridge, broken in one or two places, is seen to the NNE. coming down from the N. apparently about ten or twelve miles distant, but ending or turning abruptly towards the W. These hills are the southern extremity of the Subghautine chain, called the Jeddya or Javidie, which flanks the eastern side of the Amloor valley.

Régur, or black cotton soil, I first observed covering the plain between Chinna Salem and Walltindoorpett, immediately to the W. of the Traveller's bungalow at Congrypollum, after crossing the rivulet which flows from the Jeddya hills by Verdachelum to the Vellaur or Porto Novo river. It is much mingled with the sandy alluvial local soil, with which it covers the surface in alternate stripes. The shrub which is almost peculiar to Régur, viz. the Jatropha glandulifera, is seen in great strength; and also the interlacing fibrous roots of the nutgrass. Crops of cotton now begin to appear. Beds of kunker are seen in ravines and stream banks, and sometimes occurring in higher situations, in the form of small mammillary mounds, which appear to have concreted around the mouths of springs now choked up.

In the plain, hornblende schist is the most prevalent rock. Gneiss, often granitoidal, alternates with it, still penetrated by the porphyritic veins previously described. The layers of gneiss are seen in some

localities running round spheroidal masses in its substance, which do not partake of the laminal structure, and have just the appearance of knots in layers of wood. These spheroids when broken have the structure and composition of true grantic, and were probably boulders, or fragments of granite, embedded in the gneiss prior to its passing into the metamorphic state, when it was first formed as an aqueous deposit; a few dykes of basaltic greenstone now rear their black crests above the surface.

Chinna Salem is a large village in the South Arcot district, near its boundary on the West by Salem. The inhabitants are mostly engaged in agriculture and the weaving of cotton cloths. It was formerly under a Poligar, whose descendants are still in existence. Some of the wells are brackish.

Ahtoor.—The Arcot frontier is crossed into the Salem district, between the villages of Royapanoor and Nuttakara (about six miles westerly from Chinna Salem), to Ahtoor, which is about twenty-one miles distant.

Around Ahtoor gneiss is prevalent, penetrated by granitic veins, and also by dykes of basaltic greenstone; one of which crosses the bed of the river in a SSW. direction. The hornblende of the gneiss is often replaced by the magnetic oxide of iron in thin regular layers, alternating with the felspar and quartz of the gneiss. It also occurs in beautiful octahedral crystals with polarity. The exterior planes of the crystals have often a bright silvery appearance from lamella of mica. Their specific gravity is estimated so high as 5° 13' at a temperature of 60°. The ore is also found in steel-coloured grains, and nests disseminated in the more quartzy beds of gneiss. This is the rich iron ore employed in the smelting establishment at Porto Novo. First rate Wootz is manufactured from it. It is also used by the native smelters, who informed me that the best sort of ore is got from two hills about one and two koss distant to the SSW. of the village, which they say are full of the ore, and are called Callurchan and Mooragutta Mullaye. The natives here employ a mixture of black magnetic sand from the Nullah beds with the steel grey magnetic oxide in the manufacture of steel. The native furnaces rarely produce more than from four to six maunds of iron per diem, which sells on the spot for one rupee or less per maund. The steel and iron of Nagrepetta is

most prized by the natives, but whether this excellence is attributable to a better mode of smelting or better ore, does not appear. According to the natives, about 100 families of the Dhairs at Ahtoor are employed in getting iron ore; there are about thirty or forty iron furnaces in this vicinity.

Ahtoor lies near the base of the great break of Salem, where the high table lands of Mysore, the Balaghat, &c. descend by an abrupt step to the plains of Salem and Coimbatoor. To the south of this break, a broken disjointed mass of bare rocks forms a sort of talus to the lofty steeps on the North; but separated from them by a narrow and in general flat-bottomed valley, along which the road runs to Salem. The extreme height of the ranges to the right (or N.) by a rough trigonometrical observation from a paced base, I made to be (?) feet above the level of the valley, or foot of the break at Ahtoor. And Ahtoor by the boiling point of water I find to be about (?) feet above the sea: but these observations must only be regarded as some approximation to the truth.

The subjoined diagram\* will give an idea of this profile presented in the bolder parts of this great feature, in the physical configuration of South India. The rocks to the South of this break, after running southerly some miles, attain near Shendanumgalum, not far from their termination to the SW., an elevation little inferior to that of the ranges on the North of the break. The break itself varies from one and a half to three or four miles in width. It contracts East of Ahtoor, and opens out West of it as Salem is neared, and is about fifty-six miles long.

Ahtoor was formerly held by a Poligar, the remains of whose palace, are still to be seen in the fort, a low building supported on Saracenic arches, and covered with a terrace roof. The fort which was, it is said, built about four centuries ago by the then Poligar, Ghut Moodely, stands on the North bank of the river, rectangular in shape, and provided with wet ditch, glacis and covered way, except on the South face, which is washed by the river. The walls are of stone, with a ruinous brick parapet, garnished with mud bastions, and square cavaliers in the usual Hindoo style. It is entered by a gate on its eastern face: and, besides the palace, contains two temples to Siva and Vishnu; the remains of buildings occupied by the European garrison



which held it after the fall of Seringapatam; granaries, powder magazines, and in the NW. angle, a tomb-inscribed to the memory of Lieut. Colonel John Murray, 1st Cavalry, who died 1799, erected by his widow, (6th May) also an obelisk, from which the inscription evidently has been shamefully removed.

Ahtoor is now the Kusbah, or capital town, of a Taluk, Lat. N. 11° 40′ and Long. E. 78° 48′. It comprises, the natives say, upwards of 1,200 houses, occupied chiefly by Kuddiyans, or cultivators, (exclusive of the Nellalo, Pulli, Agmuddi, Nattaman, Mullayman, Latraman &c.,) and Dhairs, chiefly engaged in procuring and smelting iron. There are also nearly fifty families of Brahmins, of whom the Smaltal sect is much the most numerous; next the Maduals, and finally the Sri Vaishnovams. There are about fifty houses of Mussulmans, chiefly employed as peons, in mat-making, day-labour, and a few in agriculture. To hold the plough is almost a dernier resort with a Mussulman of South India.

The houses are neater, and more cleanly than any I have seen in this part of India, and are often tiled. Mr. Fischer, who may be truly styled the Salem Zemindar, has a depôt for indigo and cotton here. I saw thirty six women and children employed in cleaning cotton, which is done by means of wooden cylinders, resembling those of an Indian Sugar-cane mill on a small scale, revolving horizontally, and turned by the hand.

The table land on the hills to the North is said to be held free by Poligar Pedda Collaray. It produces hill-rice, castor-oil plant, Kimbgoni, and a little common rice. The produce of the land about Ahtoor is much the same as at Chinna Salem. The water of the wells is often brackish.

Salem.—From Ahtoor to within three miles East of Salem, the Pass continues along the southern base of the elevated table lands of the Balaghat. Near Salem the mountains which support them assume a bolder and more indented outline, rising in separate conical peaks, domes, and abrupt ridges. The highest peak of the Moolnad by rough trigonometrical calculation, is upwards of 3000 feet above Salem, and Salem itself, by the boiling point of water, is about 1,131 feet above the sea.

The same formation prevails around Salem as at Ahtoor. The gneiss is often penetrated by veins of eurite, of a faint reddish and

greenish white; and with red felspar coloured with actynolite and chlorite. Hornblende schist is very prevalent, mica and talcose schists less so.

The foot of the steep descent of the Shevaroy hills is about six miles to the N. by E. from Salem. The granite lossing its mica passes often into a pegmatite, and gneiss into leptinite.

Both Regur, alluvial reddish, sandy and clay soils, and mussub or regur mixed with alluvia, are found around Salem. The staple productions are cotton, indigo, rice, bagra, and juari. The table lands of the Shevaroy hills produce fine coffee, of which extensive plantations have been recently formed.

Heyne tells us that formerly the East India Company had an establishment for the purchase of cotton-manufactured goods here, but now English cotton cloths drive the Indian out of the market, and the raw material is exported to England, manufactured into cloth, and undersells the Indian cloth after having perform two voyages, collectively equal to the circuit of the globe.

The subsoils are kunker and mhurrum (gravelly detritus of rocks in situ) saltpetre, murate and carbonate of soda, occur in the surface soils.

Salem.—Salem is capital of a collectorate of the same name, situated Lat. North 11° 41' Long. East 78° 14' in the plain a few miles to the SW. of the great break in the table land of the Balaghat, which here descends upwards of 3000 feet to the plains of Salem and Coimbatore, by the steeps of the Shevaroy mountains.

The Civil and Judicial head-quarters of the district are fixed here, though the collector generally resides at Ossoor, on the table land. A detachment of Native Infantry, furnished from the garrison of Trichinopoly, of three Companies, supplies the treasure and jail guards, &c. (March 1840.)

The native town lies on the left or eastern bank of the Tirrimani stream, which empties itself into the Cauvery, and separates the town of Salem from the fort, barracks, and residences of the Europeans. It is about sixty paces broad, and crossed by a bridge of five arches. During the dry season, like the other streams of South India, it cannot boast of too much water.

The native town is nearly a mile in length, the main street broad, clean, and in general well drained.



The houses are usually tiled, with verandas in front, supported by wooden pillars, and sheltered from the oblique rays of the sun by awnings of cotton cloth. The market day is held on Tuesday. Beside cloth manufactories, Salem boasts of the best steel manufactory in South India, and the name of Arnachelum, for beautifully tempered heads for hog spears, and couteaus de chasse stands unrivalled. The iron and steel come principally from Ahtoor, Tumbumputty, Shendamungalum, Trimulkerry, and Namgurpett, Indigo is another of its principal exports.

A considerable quantity of salt-fish is imported from the Western

Coast.

The population of the town and suburbs cannot be less than 35,000, of which the weavers form the greater proportion.

The fort is of mud and stone, and now a ruin. It was built by

Chinnaper, and contains a temple to Alighirry Permalvo.

Mr. Fischer holds lands in and around Salem, amounting to about 1,25,000 acres, from the Government, on the yearly payment of 5,000 pagodas. He has an experimental garden here, which is promising, in which I observed tea from Assam, Guinea grass, Otaheite sugarcane; and among many other rare fruits, the apple and pear, which

do not appear to thrive.

The physical as pect of this district is particularly varied and beautiful, extending over the table lands of the Balaghat, and over the plain of the Baramahal, which is said to be 550 feet higher than Salem. Besides the Jiwadie, Shevaroy, and Ahtoor ranges already touched on, and which belong to the line of Ghaut elevation, are the ranges of Shendamungalum and Collymully, on the SE. confines of the district, all inhabited and cultivated. To the South-westward, the country is more open, and descends slightly in a plain to the bed of the Cauvery, which, with the Palaur in the Baramahal, are the principal and almost only drainage lines of any importance, Bast of Salem the slope is easterly to the sea. In the Baramahal, towards the NE., the area is estimated at 6,520 square miles, of which only about 3-10ths are cultivated, with a population, (exceeding that of Coimbatore) of 9,05,000 souls, or about 112 per square mile, chiefly employed in agriculture and weaving. The annual revenue is about 191 lacs of rupees. 5 K

The roads through the Salem district, made under the judicious directions of Mr. Orr, are the best in the Madras Presidency.

Chrome and Magnesite Mines.—From Salem I visited the Chromate of Iron and Magnesite mines, of which an account will be found in the Journal of the Royal Asiatic Society, No. XIII, for May 1842. The former are situate about four miles to the NW. of Salem, in a bed of magnesian rock, analogous to serpentine, and associated with talcose mica, and hornblende schists, and gneiss.

The mineral is found in veins with the magnesite, the mines for which are hard by: but the latter seems to exist in greatest abundance in the hornblende schist, which is highly garnetiferous.

The mining tract is an assemblage of low broken rocks, spreading over an extensive jungly tract, at the West base of the Shevaroy mountains.

Sankerry-droog. The rock on which stands this old Droog, is about twenty-four miles SW. from Salem. It is composed of a fine porphyritic granite, which has broken up the gneiss on its flanks, and rises boldly from the plain to a height (approximated by a trigonometrical observation from a paced base) of 930 feet.

The sides are masses of bare rock, often precipitous, between which not unfrequently pushes forth a vigorous vegetation.

The porphyritic granite has invaded the hypogene rocks, and burst through them in innumerable dykes on its SW. flank; the gneiss rests like a mantle, with a general dip of 75°. S. 15' W. but the strata are in much disorder and confusion. On the western side, the gneiss is seen interstratified with layers of hornblende, actynolitic schist, and garnet rock, in which is a layer of a fine crystalline limestone, (marble) which from its effervescence with acid, and peculiar appearance and weight, I should think is magnesian. Near its contact with the garnet rock, its substance is starred with innumerable minute garnets, both red and green. Garnets of a light brown colour, resembling cinnamon stone, also occur in this limestone stratum; the limestone is seamed by a dull amber-coloured hornstone, which penetrates the rock in thin seams, and stands out in relief on the surface of the more rapidly weathering limestone, giving it a grooved and corrugated aspect.

The green garnet is found in the largest crystals, in the white quartz veins which intersect the hornblende schist and gneiss. The green

garnet, (if so it is, for I have not yet had opportunity of submitting it to analysis) is in general of the foliated, rhomboidal variety, and with its white quartz matrix form a very beautiful rock. The quartz imbedded also a mineral of a hair-brown colour in hexagonal prisms.

The variegated appearance imparted to the limestone near the line of junction by the admixture in irregular lines of red and green crystals, is curious and interesting.

These beds can be traced on the side of the rock till they disappear under masses of porphyritic granite, which have slidden down from above. In contract with veins of granite the garnet rock acquires a glazed surface, and a disposition to split into prisms when struck with a hammer.

The felspar of the porphyritic granite is usually reddish; the mica dark green, and the quartz of a light transparent grey. The two latter minerals are occasionally wanting; the felspar becomes a granular or compact paste, imbedding larger crystals of felspar; in short, a true porphyry.

The country surrounding the base of this rock, which affords so instructive an example of the effects of Plutonic intrusion among the metamorphic schist, is bold and rocky; and, towards Salem, the dark low ridges show that hornblende schist is the prevailing rock, intersected by low ridges of white quartz.

Near Sankerry-droog granite and gneiss are more common; the presence of the first being clearly indicated to the traveller by the bolder aspect of the country.

The gneiss and other hypogene strata are almost every where bent and contorted. The Traveller's bungalow stands on a bare surface of gneiss, presenting a curious example of contortion, and the rock of Sankerry-droog is a finer example of granite veins in gneiss than the far famed Cape Wrath itself, figured by McCulloch and Lyell.

The soil is mixed regur and red alluvial; saltpetre is manufactured in the vicinity.

The hill fort was once a place of great strength, and originally built by a Beder Poligar, it was subsequently strengthened by Hyder and Tippoo, and within the last twenty years was garrisoned by the Company's troops. The village of Sankerry-droog now contains nearly 300 houses, chiefly of Telinghi, Bulgawar, Mahomedans, Pullaywars, Yeddyers, cloth-weavers, and a few Brahmins of the Madul, Smartal and Srivaisnavam sects; the first predominating. It is worthy of remark that a few Canarese families are to be found here, also a few Telas and Comtis. Saltpetre and silk are manufactured here.

The Thermometer (Faht.) placed on the naked rocks at this place, at 2 P. M. in a clear tranquil day, and fully exposed to the sun's rays, stood at 120°, at 5\frac{1}{2} P. M. 100°.

About six feet above the rock's surface it indicated 110° at 2 p. m., shade 90°, and at 5½ p. m. 90°, shade 82°.

On the sandy soil at 2 P. M. the mercury rose 4° higher than on the rock.

The temperature of a spring was 82°4. These observations were made in the middle of March.

Erode. From Sankerry-droog to Erode, which lies about 13 mile on the right or South bank of the Cauvery, there is a gentle sinking of the face of the country towards the bed of the river; the formation is chiefly gneiss and hornblende schist; strike of strata towards S. 20° E. and dip at an angle of 80° E. 20° N. There are many irregularities and exceptions to this rule.

The mica of the gneiss in the bed of the Cauvery near Erode is dark shining and foliated.

The surface of the rock has been scooped out by the action of the water into longitudinal furrows and troughs, following the line of stratification, which here happens to be parallel to the course of the stream.

An examination of the grooves and troughs is interesting in many points; and especially as demonstrating the difference caused either by the action of water alone, or by gravel and sand hurried along by water over rocky surfaces, in contradiction to the furrows resulting from glacial action.

The latter run on in straight undeviating parallel lines, unaffected by the different degrees of hardness of the rocks, while the depth of the former, and sometimes even their direction, perpetually varies with the varying resistive powers of the rock, and are particularly obvious from Pondicherry to Beypoor.

whenever quartz or chert veins happen to cross the gneiss in the direction of the stream, when they stand out usually in relief, and but little comparatively worn down.

In the channel of the river I found a coarse sand and gravel consisting of rolled fragments of quartz, syenitic granite, granite porphyry, basaltic greenstone, augite rock, hornblende schist, reddish porphyry, with tourmaline, like that higher up in the bed at Seringapatam, chert, jasper and iron ore, (oxides and hydrates). The sand contained magnetic iron sand, garnet, corundum, and a pale sapphirecoloured quartz the latter rarely; evincing the existence of mines of these minerals in the rocks higher up the bed.

The corundum, ruby, and sapphire are all known to exist in the Permutty Taluk lower down, and the beryl at no great distance.

The Cauvery at Erode divides the Salem and Coimbatore Collectorates. Erode stands in the latter, and is Kusbah of a Taluk of the same name. Latitude 11° 20' N., longitude 77° 48' E. Buchanan states that, under Hyder's government, Erode numbered 3000 houses; in Buchanan's time it had scarcely more than 300, having been sacked by General Meadows' army in the war with Tippoo. The population has not much increased, it consists of the same castes as at Sankerrydroog, with Brahmins of the three sects.

The cultivation is principally rice, the produce of a tract watered by a canal from the Bhowani river to the North, dug, it is said, by a Vellala, named Kalinga Raya Conda.

The ruins of the extensive mud fort, formerly one of our garrison, now contains nothing but a pagoda, the houses of a few Pujaris (officiating priests), and a depôt for saltpetre manufactured in the vicinity, the property of Mr. Fischer of Salem.

The earth from which it is here obtained is that from the sites of decayed villages. It is reddish in colour, and mingled with old coarsely pulverized brick and mortar, wood ashes, and decayed vegetable and animal matter. The saltpetre is extracted by the usual process of lixiviation and evaporation, and boated down the Cauvery from Moganore during the monsoon months, to Nagore, whence it is shipped by sea to Madras.

The boiling point of water in this part of the Cauvery valley indicated a depression below the plains of Salem of about 250 feet.

Chennamulla.—From Erode to Chennamulla a number of rocky undulations are crossed, running parallel with the strike of the strata nearly SSW. The formation is gneiss alternating with mica, and hornblende schist, with layers of actynolitic schist. The dip is one-rally E. 15° S.

The hill of Chennamulla is a mass of stratified quartz sprinkled with garnets and passing into garnet rock. Some of the imbedded garnets are tolerably well crystallized, and of deep rich colour. The prevalent form of crystal is the dodecahedral, the rhombic dodecahedron (Almandine) is not so common. The gneiss is often coated with incrustations of a flesh-coloured kunker: and beds of it form in many places the subsoil. The surface soil is in general reddish and gravelly.

At the foot of the rock I picked up a fine garnet imbedded in a nest of a dark fibrous hornblende.

Beryl mines of Konghyum.—From Chennamulla I visited the Beryl mines of Konghyum, of which a description has been already given by me in Jamieson's Philosophical Journal.

I shall now content myself by pointing out, that they lie close to the village of Poddioor in the Konghium Taluk, about forty miles ENE. from the town of Coimbatore, which lies in 11° N, and 77° 1′ E. It occurs in the vicinity of granitic, porphyritic, and pegmatitic veins in the gneiss, associated with fine specimens of rock crystal Cleavelandite, and, 'though rarely, pyramidal felspar or scapholite. Konghium was the ancient name for the Coimbatore district.

Avenashy.—Gneiss, and hornblende schist penetrated by granite and basaltic greenstone, are the rocks next within the plain around Avenashy. Dip of strata, E. 10° S. strike N. 10° W. Soil and subsoil similar to those of Chennamulla. Saltpetre is here manufactured from a mixture of old village refuse with the rich vegetable soil dug from the bottom of a tank. Patches of the ordinary soil are seen moist with impregnations of soda. The staple articles of produce are juari, raggi, and bajra. Cotton is grown at a little distance in the regur plains. Cotton cloths are here manufactured.

The village is pleasantly situated in the plain at the base, and within view of the towering peaks of the blue mountains; it was anciently a place of note, but has decayed latterly, and the Kusbah is transferred

to Cheyoor. It now comprises about 100 houses, principally of the cotton-cloth weavers, comtis, musicians, (Bajindris,) dancing girls, Pullaywars, and Brahmans principally of the Smartal sect.

It possesses a temple of some sanctity, and holds a Jatra and great cattle fair once a year, in the month Chaitra. The temple, which is dedicated to Iswara, faces the East, and is approached by a bridge built in the old Hindu style as at Bijanugger, that is, formed by slabs of stone resting horizontally on perpendicular stone pillars, sink in a triple row into the bed of the stream. Near this is a colossal statue of the sacred bull.

The great archbishop, or Swami of the Smartal sect, Sencra Bharti, of Singhery Math, has a branch Math here, now under charge of Mathmudra, Samana Shastri.

Coimbatore.—As the base of the western ghauts is approached, the plain undergoes a gentle but sensible rise. It is now covered with wild vegetation, and its surface more rugged with the channels of the Ghaut streams. Patches both of red soil and regur cover for the most part the subjacent rocks, which the sections afforded by wells, banks of streams, &c. show to be hornblende schists, gneiss, with large beds of quartz, and dykes of basaltic greenstone. The subsoil is generally either a gravelly detritus of these rocks, or beds of kunker from one foot to twelve feet thick; often grey, and ash-coloured. In some places both red and black soils abound in soda and common salt, and excellent saltpetre is extensively manufactured.

The staple articles of cultivation, are cotton, juari, bajra, tobacco, and rice. The Company since my visit have established a cotton farm here, under the able superintendence of Dr. Wight, the principal object of which is the improvement, by a better course of agriculture, of this staple, for European markets; Indian cotton being decidedly inferior to American in this respect; also the trial of the introduction of the cotton plants of other countries, viz. America, Bourbon, &c.

Iron ore, principally the black magnetic sand, is smelted at Topumbetea and Contempully, it is found near Colengoda, and in most of the hilly districts north of the town. According to barometrical observations by Messrs. Baikie and Dalmahoy, the palace of Coimbatore is 1483 feet above the sea's level. This pretty nearly coincides with the height given by the boiling point of water on the ground of the mili-

tary lines, which I found to give 1416 feet. Coimbatore town lies about sixteen miles to the E. by N. of that singular gap in the Western ghauts, the Paulgaut Pass; it is laid out on the surface of a high plain in regular and broad streets, lined with houses having tiled roofs, and verandas in front. The houses have rarely an upper story, and are inferior to those of Salem. Near the middle of the town stand the remains of a palace built or rebuilt by Tippoo, who made it his occasional residence. It is used as a kutcherry and depôt for tobacco, which is brought here in large quantities from the interior for export to the Malabar Coast. The palace hardly deserves the name. It is a terraced, massive building, with open quadrangles, closed by ponderous gates. A neat mosque is pointed out as also erected by Tippoo.

About a mile on the rising ground to the NE. of the town stand the barracks and officers' quarters, occupied by two companies of Infantry and their officers, from the garrison of Trichinopoly. Here is also the Chapel and burial ground of the Church Mission. The Traveller's bungalow and post office are in the town. The fort is a complete ruin. There are also a Roman Catholic Chapel, four mission schools, and two private English schools.

About five miles westerly, at Perur, is a temple to Siva, called Mailchittumbra, celebrated for its sanctity, and as having been one of three pagodas spared by Tippoo. The others were those of Seringapatam and Mailcotta in Mysore. The natives assert that this temple was built 3000 years ago by one of the Pandion kings of Madura; but I did not find any inscription on stone to corroborate such an assertion.

The temple itself is neither grand nor beautiful; but the style and rudeness of the architecture and sculpture indicate a considerable antiquity.

The province of Coimbatore was formerly part of the Chera kingdom. Perur, just mentioned (or the city), is supposed to have been one of its greatest towns, and the Talakad, on the banks of the Cauvery, which separates the northern extremity of Coimbatore from Mysore is said to be on the site of its ancient capital (Dalavanpura.)

I cannot find that the present capital town, Coimbatore, was of any great ancient importance; it probably rose upon the decay of its neighbour Perur. The descendants of the old sovereigns, the Velar Rajas, still exist, I am told.

The physical aspect of Coimbatore, though broken by hills on its northern, western, and southern confines, presents, generally speaking, an undulating open plain, sloping away southerly and easterly from the great break of the Ghauts,—with an average elevation of about 900 foot above the sea. The Cauvery, to which the inferior lines of drainage, viz. the Bowany, Noel, and Amberutty converge, carries off the superfluous water to the Bay of Bengal.

Its area is estimated at about 8,400 square miles, with a population of upwards of 800,000, of which about 8-10ths are engaged in agriculture and weaving. The number of females, according to the census published in the Madras Almanack for 1839, slightly exceeds that of the males, which whether fact or not, is a circumstance worthy of enquiry, in a country where (among the Mahomedans) polygamy is allowed, marriage a religious duty, and concubinage and prostitution prevalent among all castes and sects. The revenue is estimated to average 21 lacks of rupees annually."

Coimbatore, at an early period of its history, fell into the hands of the Madura Rajas, and in the 17th century was wrested from them by the Mysore Rajas, from whose hands it fell into those of Hyder and Tippoo. The English took it from Tippoo in 1783, but restored it at the peace 1784. Again taken possession of in 1790, repulsed the efforts of Tippoo to storm it, but afterwards surrendered on terms which were violated, and the garrison detained prisoners until the peace of 1792. Since the fall of Seringapatam in 1799, it has formed an integral part of our possessions.

The population of the town of Coimbatore (1840) is said to be from 25,000 to 30,000 souls—composed chiefly of weavers, agriculturists, and merchants, Brahmans of the three chief sects, as at Sankerry-droog. Mussulmans, musicians and dancing girls are numerous here, as might be expected.

Tamul and Canarese are both spoken at Coimbatore, which approaches the southern boundary of the ancient kingdom of Karnata, where Canarese almost exclusively prevails, and also the eastern boundary of Malabar, where Malayalim is the vernacular language of the country.

Pass of Palghaut.—This great chasm in the wall of the Western Ghauts is about fifteen miles in average breadth from N. to S. and



about twenty-eight miles long from E. to W. It is about twenty-eight miles wide where it opens upon the Malabar coast, and twenty-two at its debouchment on the plains of Coimbatore; between these points its width is irregular, but it narrows in some parts to eight or nine miles. Its surface, and the lower flank of the Ghauts on each side, are covered with elephant jungle and thickets of bamboo growing in a thick reddish and grey soil, which cover the rocks, and are great obstacles with the jungle to geological examination. Glimpses are occasionally obtained in passing through this forest of the lofty heights of the Nilgherris and Koondas, which flank the right of the Pass, some of which tower 2000 feet above it, and of the mountains, which resume the line of elevation on the left.

The bottom of the Pass is a plain, gradually rising toward the west by rocky undulations running parallel with the line of elevation, which cause alternate rises and falls in its surface. The ascent from Coimbatore and the descent to the sea-coast on the other side are so gentle, that I conceive it probable that the height of the Pass never much exceeds that of Coimbatore itself.

The boiling point of water makes the town of Palghaut on the Western slope 7-10ths of a degree lower than that of Coimbatore. Down the middle of the Pass winds the Ponani river to the Malabar Coast, and the Indian sea. It is formed by rills from the Ghauts uniting in the centre of the Pass west of the water-shed.

The rocks observed in the Pass, and on its Northern flank, were chiefly of gneiss and hornblende schist, massive hornblende rock, and a small grained quartzy granite, with both black mica and hornblende: the mica is occasionally wanting.

The mass of gneiss on which the Traveller's Bungalow at Wolioor stands, is of the variety which is termed by geologists granitoidal, or thick-bedded gneiss, and by others, laminar granite. This however though its structure may appear granitic in hand specimens, is evidently a stratified rock, and is seen, a few miles westward, to pass into a beautifully characteristic, stratified gneiss, which imbeds small black shining scales of mica, and a granular white quartz in alternate layers.

A large grained granite penetrates the gneiss, often containing large reddish crystals of foliated felspar, greenish felspar coloured by actynolite, and occasionally adularia.



The strike of the stratification is generally W. 5° N., and dip 80° S. 5 E. Stratification, with the help of a telescope, is seen beautifully distinct in some of the highest bare peaks which occasionally overlook the Pass;—for example, North of the hamlet of Ganjicota, where the Pass opens out to the Westward.

The sand brought down the mountain sides by rills and streamlets, consists chiefly of quartz and mica, with magnetic iron sand, and occasionally particles of gold found after heavy rains, comminuted garnet and hornblende, and rusty ferruginous particles. Bits of the bronzite and hyperstene varieties of hornblende are also met with in thin beds.

The surface soil, when mingled with the decayed vegetable matter of the forest, forms an ash-grey coloured mould, soft and friable to the touch; this is the prevailing soil. Around protruding rocky masses, the usual reddish alluvium and detritus from the surrounding rocks, prevails.

The subsoil is usually a bed of angular gravel, the under fragments of these rocks. Beds of clay and kunker are occasionally substituted.

While journeying through the forest, the more than midnight silence of a tropical noon was suddenly disturbed by the loud crashing of the tall, dry clumps of bamboos, and underwood of the jungle in front of us, as if some infuriate elephant was advancing upon us in all the frenzy of the periodical madness these animals are afflicted with. Raising our eyes in haste, we beheld a tall white column of dust madly gyrating here and there, high above the highest trees of the forest, whirling about fragments of sticks and leaves, the wreck of the bamboo clumps in which its lower extremity was performing most destructive gambols.

After crashing about for some time, its lower half, like that of a water spout, separated from the upper or more celestial portion,—which curling upwards gathered itself into a canopy, or cloud above our heads, from which dropped the heavier particles it had whirled into mid-air; then gradually dissolving it vanished, leaving the forest to its former death-like stillness, after a temporary disturbance of three minutes.

Such is a Peshash (a devil) in the jungle.

The Thermometer stood in the shade at 116°, and a death calm prevailed in the surrounding atmosphere.

Puducherry.—Near the little fort of Puducherry, which is in the Pass, the laterite of Malabar (for the Salem boundary was crossed near the Ponani stream) is seen resting on gneiss; between this and Palghaut the country is less jungly, but still well wooded, with fine trees.

Palghaut.—This town, fort, and military station stands near the opening of the Pass on the Malabar coast, and is about fifty-two miles direct distance from the sea, and about four miles W. of Puducherry. The Ponani stream is navigable for boats to within fifteen miles of Palghaut.

The town is almost surrounded by the Agrarums of Brahmans and enclosed estates of wealthy Nairs: it is laid out into neat streets: the houses look clean, and are usually tiled or thatched with the bamboo and palm leaf.

The pagodas here and elsewhere in Malabar, (the old Malayalam kingdom) differ from those of the Carnatic and Balaghat in being covered with conical tiled roofs, like a Malay mosque, and in wood being largely employed in their construction. The different physical features of the country account sufficiently for this difference in the religious architecture of the Malayalam nation. Granite is scarce, and usually lies at a distance: the porous laterite would make indifferent roofing slabs; whilst the great forests of Malabar yield a never failing and cheap supply of the finest timber.

The roofs of the pagodas terminate in the usual gilded Calas. The colossal equestrian statues so common in the Chola kingdom, are now no longer seen, but in their room we have the isolated granite blocks of Carculla carved into the gigantic statue of Gomuta Raya.

The fort stands on the commanding ground on which the Military lines are built, about three-quarters of a mile easterly from the pettah.

The fort is small, but well put together, of stone, in shape quadrangular, and consists of a curtain flanked by round bastions; the whole surrounded by a wet ditch, covered-way, and glacis. The only gate faces the east, and is protected by an outwork in the European style,



the work, probably of some French engineer in the service of Hyder, who is said to have built the fort itself, in 1766, but at all events remodelled it.

The parapet is high, pierced with loopholes for musketry, and the bastions with embrasures for guns. I counted about forty guns, rusty and apparently unservicable, lying about the place.

Palghaut is now the head-quarters of a regiment of Native Infantry: It is the key of the Coimbatore and Salem districts, from the western coast.

It used to be noted for the manufacture of furniture. Rice is the staple article of cultivation. The mountains in the vicinity can supply large quantities of teak and other valuable timber. The pepper and cardamum flourish on their sides and in their defiles; and their forests shelter herds of bison and elk, whose horns form an article of traffic.

Palghaut before Hyder's time, was under a Wair Raja, who was in some measure feudatory to the Hindu Rajas of Mysore.

On their downfall, it fell into Hyder's hands, who strengthened it as a Military post, commanding the only communication with Malabar from Coimbatore.

It was early seized by the English in their wars with Hyder; evacuated 1768, by Lieut. Bryant; retaken 1783, by Col. Fullarton; again fell into the hands of Tippoo, but retaken in 1790, by Col. Stuart.

The Pass of Palghaut, as might be anticipated, exerts a considerable influence over the meteorology of the places to the East and West of it. In the SW. monsoon while the table lands of the Balaghat, and the plains of the Carnatic, sheltered by the great wall of the Western Ghauts, are burnt up with the rays of a scorching sun, the places immediately to the East of this wide gap are favoured with a portion of the cooling showers and breezes which are wafted through this mountain opening over the forests of Malabar from the Indian ocean.

On the other hand, it serves as an outlet to those furious storms from the Eastward, which sweep the Bay of Bengal, and after traversing the peninsula, burst forth through it to the Indian sea.

Vaniencolam.—This is a village in South Malabar, about twentyfour miles and a half W. by N. from Palghaut. Like most Malabar villages in the interior, it consists of huts in separate enclosures, shaded by the cocoa, areca palm, and the jack, spreading over a large area, the surface of which is diversified with two wooded hills, and watered by numerous mountain rills.

The Traveller's bungalow stands on one of these low eminences on a bed of laterite resting on gneiss. The gneiss is hornblendic, strike of strata W. 50° N., and dip 86° S. 5° E.

The soil is red, and often consists of a barren katerite detritus. A well, twenty-four feet, is cut in the laterite.

A market for salt fish from the coast, cotton cloths from Coimbatore, &c. is held here every Saturday. Approximate height above sea by boiling point, 393 feet.

Waliyar.—A tiled Bungalow for the accommodation of travellers, has been erected by a liberal native banker of Coimbatore, named Bisram Singh, in this forest hamlet, which consists only of a few rude huts. The surrounding jungles are rather notorious for being the favourite haunt of the tiger and elephant at certain seasons. Few instances, however, have been recorded of their attacking travellers. The natives affirm it is dangerous to sleep here during the cold months of November, December and January, on account of a jungle miasma which engenders fever. Laterite is the prevalent surface rock.

The approximate height above sea by boiling point 283 feet.

Tirtalla.—This is a large village in S. Malabar, a few miles from Palghaut,, about sixteen miles direct distance from the sea at Panani. It is pleasantly situated in a valley, flanked by hills of gneiss and hornblende schist partially overlaid by laterite, on the banks of the Walliyar or Ponani river. The strata of gneiss, which is highly weathered, run E. by S. and dip 45° toward the S. The banks of the river consist of a loosely consolidated laterite clay and sandstone overlying a bed of a stiff black carbonaceous clay. It is not improbable that lignite and mineral copal exist in this vicinity, as I found a small fragment of the latter in the river bed. The sand which covers it, is quartz and micaceous. On digging to the depth of five feet, I found layers of a white coloured sand alternating with sand of a ferruginous colour and thin layers of a dark brown clay passing into black.

The soil in the rice grounds is a sandy clay mingled with decayed vegetable matter.

The staple article of cultivation here is rice, and the prevailing castes, are Namburis, Tiars, Moplays, Churmars and Vellalis.

In the jungle I saw some of the squalid aborigines of Malabar,—
the Neadis—who reminded me in feature and lowness of stature of
those of the Malay Peninsula, and of the Chensu-var, inhabiting the
jungles of the Eastern Ghauts.

Betiangady.—The houses, or huts rather, composing this Malabar village, are scattered as usual over a large space of ground. The flat, cultivated rice vallies run down towards the sea, flanked by steep, low ranges of laterite, like so many rivers enclosed by banks. The soil is lateritic, manured chiefly with decayed vegetable matter and wood ashes.

Staple article of cultivation, rice; and the prevailing castes much the same as the last march. The Traveller's bungalow stands on a low hill of laterite, which by the boiling point is about 320 feet above the sea.

The temperature of water in a well twenty feet deep, in laterite, was 82°. Of air in shade at the time (March 23rd, 5 p. m.) 87°.

Beypoor.—The sea is first seen at Beypoor, a large village at the mouth of the Beypoor river, Lat. N. 11° 12′, and Long. E. 75° 52′. The cliff on which the Traveller's bungalow is pleasantly situated, is of laterite. It is on the north bank, and commands a good view of the embouchure and bar. The prevailing rock is laterite, running down in low flat topped ridges from the interior, separated by flat bottomed tortuous vallies, which have been evidently scooped in it when the land was uplifted from the bed of the sea. These ranges usually terminate in precipices of from forty to one hundred feet high at the sea.

The laterite embeds layers of lignite associated with sulphates of iron and alumina (the result probably of the decomposition of iron pyrites,) and occasionally mineral copal. The largest bed of lignite occurs at the base of the cliff of lateritic sandstone, which overlies it a short distance up the river, on its right bank, in a bed of black and grey micaceous slate clays and shales.

Beypoor was formerly a favourite sea-port of Tippoo, who styled it. Sultan-patnam, the city of the Sultan; he constructed a fort on the river, warehouses, and an arsenal.



782 Notes, chiefly Geological, from Pondicherry to Beypoor. [No. 166.

The Portuguese formed an early settlement here. The ruins of this fort are still pointed out by natives on the sand bar. The river is navigable during the monsoon many miles into the teak forests of the interior, and affords a capital mode for the transit of ship-building timber, by rafting to the coast. A low mill with sails moved by the wind is standing, but I believe no longer in use. A large quantity of timber is still shipped for the supply of the Dock-yards at Bombay, and large vessels (to 700 tons) are occasionally built here. Sail-cloth is manufactured, and excellent tar from teak-wood shavings and saw dust.

The village contains about 400 houses, inhabited chiefly by Tiars, Mairs, Polliars, Churmars, Soottars, Mukkoons; with a few Namburi Brahmans, Kunnishuns, and Moplays, and has a busy thriving appearance.

The Beypoor river is one of the most considerable in Malabar. It will admit vessels of 300 tons within the bar, and it is navigable during the greater part of the year to Ariacode, twenty-five miles, and during the monsoon to Nellumboor, the principal teak forest, forty-four miles. In its sands after the rain, and along the sea-coast, gold dust is frequently found in small quantity.

Proceedings of the Asiatic Society of Bengal, NOVEMBER, 1845.

The stated monthly meeting of the Society was held on Wednesday evening, the 5th November, G. A. Bushby, Esq. B. C. S. in the chair.

The following new member was ballotted for and declared duly elected:

Lieut. D. Briggs, B. N. I.

And the following new members were proposed:

J. Christian, Junior, Esq. Monghyr,—proposed by the Sub-Secretary, seconded by the Secretary.

W. Taylor, Esq. B. C. S.,—proposed by the Secretary, seconded by the Sub-Secretary.

A. Wattenbach, Esq.—proposed by the Secretary, seconded by the Sub-Secretary.

Donald Mackey, Esq.,—proposed by E. Blyth, Esq. seconded by S. G. T. Heatly, Esq.

Ensign F. H. Riply, 22nd N. I.,—proposed by E. Blyth, Esq. seconded by the Secretary.

L. C. Stewart, Esq. M. D. Assistant-Surgeon H. M. 39th Foot,—, proposed by E. Blyth, Esq. seconded by the Secretary.

W. Theobald, Esq. Barrister at Law,—proposed by E. Blyth, Esq. seconded by the Secretary.

T. C. Jerdon, Esq. Madras M. S.,—proposed by H. Torrens, Esq. seconded by E. Blyth, Esq.

The following list of books, presented and purchased, was read:-

List of Books received for the Meeting of Wednesday, the 5th November, 1845.
Books Presented:

- 1. Calcutta Christian Observer for October, 10.5.—By the Editors.
- 2. Oriental Christian Spectator, vol. 6, No. 10, for October, 1845 .- By the Editor.
- 3. Mekhitaristes de Saint-Lazare, Histoire d'Arménie, par le Vaillant de Florival. Vanise, 1841, 1 vol.—By J. Avdall, Esq.
- 4. Nuovo Dizionario Italiano-Armeno-Turco. Comp. dal P. E. Ciackuak. Venezia, 1829, I vol.-By J. Avdall, Esq.

- CENTRAL LIBRARY
- 5. On the Temple of Somnath, by Col. Sykes, 1843, P .- By the Author.
- 6. Bhuddhism versus Brahmanism, 1842, by Col. Sykes, P.-By the same.
- 7. On the three-faced Busts of Siva, by Col. Sykes, P .- By the same.
- 8. Inscription from the Boodh Caves near Joonar, by Col. Sykes, P.-By the same.
- 9. On the Population and Mortality of Calcutta, by Col. Sykes, P .- By the same.
- 10. Statistics of the Educational Institutions of the East India Company in India, by Col. Sykes.—By the same.
- 11. First report of a Committee of the Statistical Society of London, on the State of Education in Westminster, 1837, P.—By the same.
- 12. Report on the Vital Statistics of Large Towns in Scotland, London, 1843, P.—
  By the same.
  - 13. Statistics of Cadiz, by Col. Sykes, London, 1838, P.-By the same.
- 14. Statistics of the Metropolitan Commission in Lunacy, by Col. Sykes, P.—By the same.
- 15. Statistics of the free City of Frankfort on the Main, by Col. Sykes.—By the same.
- 16. On the Measurement of Heights by common Thermometers, by Col. Sykes, P.— By the same.
- 17. Report of the Metropolitan Commissioners in Lunacy to the Lord Chancellor, London, 1844.—By the same.
  - 18. Debate at the East India House, by Col. Sykes. By the same.
- 19. Remarks on the Identity of Personal Ornaments, sculptured on some figures in the Bhudda Cave Temples at Carli, by Col. Sykes.—By the same.
- 20. Notice respecting some Fossils collected in Cutch by W. Smee,-By W. H. Sykes, P.-By the same.
- 21. Explanatory Notes respecting six new Varieties of Vine, by W. H. Sykes, P.— By the same.
- 22. London, Edinburgh and Dublin Philosophical Magazine, Nos. 174, May 1845, 175, June 1845, with supplement, No. 170.—By the Editor.
- 23. Mémoires de la Société de Physique et d' Histoire Naturelle de Genève, Tome X. 2e partié, 1844.
  - 24. List of the Geological Society of Jondon, 1845.
  - 25. Memoires de la Société Royale des Antiquaires du Nord, 1840 to 1843.
  - 26 Antiquarisk Tidsskrift udgivet af det Kongelige Nordiske oldskrift selskab, 1843.
  - 27. Die Königliche Gesellschaft für Nordische Alterthumskunde, 1843.
  - 28. Société Royale Des Antiquaires du Nord le premier Janvier, 1845, 10 pamphlets.
  - 29. A Danish Newspaper.
- 30. United States's exploring expedition during the years 1838, 1839, 1840, 1841, and 1842, by Charles Wilkes, 5 volumes, with atlas.—By C. Huffnagle, Esq.

#### EXCHANGED.

- 31. Calcutta Journal of Natural History, No. 23, for October, 1845.
- 32. Athenaum, for 9th, 16th, 23rd and 31st August, 1845.
- 33. Asiatic Journal, May, 1845.
- 34. Journal Asiatique, quatrième Série, Tome V. No. 22, Fevrier, March, 1845.

  Purchased.
- 35. Annals and Magazine of Natural History, No. 103, for August, 1845.

### Proceedings of the Asiatic Society.

#### Nov. 1845.]

- 36. North British Review, No. 6, for August, 1845.
- 37. Journal des Savants, for April and June, 1845.
- 38. General Synopsis of Birds, by J. Latham, Lordon, 1781 to 1790, 10 volumes.
- 39. Correspondence relating to Persia and Affghanistan, 1841.
- 40. Correspondence relating to Persia, 1841.
- 41. Histoire Naturelle des Poissons de 'Eau Douce, par L. Agassiz, Tom., I. Neuchatel, 1842.
  - 42. Ditto ditto plates, 2e Livraison.
  - 43. Researches into the Physical History of Mankind, by J. C. Prichard, vol. 4th.

The proceedings for the month of October were read and confirmed. Read the following letter from the University of Christiania.

To the Vice-President and Secretary of the Asiatic Society of Bengal, Calcutta.

Sin,—Having been charged by the University Council to acknowledge the reception of your favor dated 8th October, 1844, in which you inform our University of the valuable and interesting objects which the Asiatic Society at Calcutta have been kind enough to send, I avail myself of the opportunity of sending your learned institution a parcel, containing different sorts of seeds, which I hope may be of interest to your botanical garden. The Council have also ordered me previously to inform you, that a collection of several scientific objects for the Asiatic Society very soon will be sent off from here, and that a letter from the Council, which is to accompany the same, will contain a list thereof.

The Council will feel itself very much obliged to you, Sir, if you would be so kind as to buy for the account of our University Library, some books and manuscripts, the list of which follows enclosed.

Christiania, 16th June, 1845.

C. W. Holst.

The Secretary stated that he had thought it advisable to despatch the packet of seeds at once to Dr. Wallich, from whom he had a letter expressing his best thanks to the Society, and stating that several of the seeds had already germinated.

Read also the following letter accompanying a packet of diplomata :-

Sin,—On the part of the Royal Norwegian Society of Science at Drontheim, I have the honor of forwarding four diplomate for Messrs. Blyth, Griffith, Bird and Torrens, directors of the learned Asiatic Institution at Calcutta,—as members of the mentioned Society. The attention these gentlemen have shown our university, and the kindness with which they, as directors of the most learned East Indian Institution, have entered into our views of forming a more intimate scientific connexion, have induced the council of the Royal Norwegian Society to offer those diplomata as a token of its most sincere respect and obligation. In wishing that the anguable connexion which already consists between our Scientific Institutions may always grow stronger and more interesting on both sides.

I have the honor to be, Sir, Most sincerely your obedient and obliged servant,

CHR. HOLST.



The Secretary was requested to transmit those for Mr. Bird and Dr. Griffiths, the latter to his widow; and on the suggestion of the Sub-Secretary it was moved and agreed to unanimously, that the Society should take this opportunity of addressing a letter of condolence to Mrs. Griffiths: The following has been accordingly sent with the diploma:—

#### MRS. W. GRIPFITHS.

MADAM,—In transmitting to you the accompanying diploma I am directed by the Asiatic Society of Bengal to express its deep and heart-felt condolence with you for the irreparable loss which you have sustained.

The Asiatic Society had not been inattentive to the great scientific ability, untiring zeal, and thorough disinterestedness of the late Doctor Griffiths; and it looked forward to the day when, had it been so permitted, he might have been associated, and that in a position worthy of him, to the labours of its members; in aid of which he had already contributed so valuably and ably.

This hope no longer exists: but the Asiatic Society have deemed it right to express how deeply it mourns, in common with the scientific public of India and Europe, the loss of one from whose labours so much had already resulted and so much more was hoped for.

(Signed) H. Torrens,

Museum, the 7th Nov. 1845.

V. P. and Secretary Asiatic Society of Bengal.

Captain Marshall's notice of motion at the last Meeting which was as follows:—

Resolved, that it is the opinion of the meeting, that a meeting of the Society should invariably be held once a month for the purpose, if of nothing else, of affording the members an opportunity of meeting together: and that the day of meeting should if possible be the first Wednesday of the month, as they consider it a matter of convenience and importance to have some fixed day of meeting, and at the same time to adhere to the original rules of the Society.

and had been circulated to town members with the following note:-

CIRCULAR.

To

SIR,—The accompanying notice of a motion by Captain Marshall for the ensuing meeting of the Asiatic Society, is circulated for your information, with a request that you will benefit the Society by attending to assist at its discussion.

H. TORRENS,

Asiatic Society's Rooms, the 22nd Oct. 1845.

Vice-President and Secretary.

was now brought forward and read by the Secretary.

In the absence of Captain Marshall the resolution as above was proposed by the Chairman, seconded by the Secretary, and carried. Read an application from the Zoological Curator, respecting certain books which he desired to have purchased.

The purchase was sanctioned, under a reservation as to some of the books not priced, which was to be left to the Secretary.

Read the following application from T. C. Jerdon, Esq. of the Madras Medical Service :-

To H. Torrens, Esq. &c. &c. &c.

Sin,—May I request that you will lay before the Asiatic Society of Calcutta my request to be permitted the loan of new, rare, or interesting birds and other specimens from their museum, for the purpose of being figured in a continuation of my present publication "Illustrations of Indian Ornithology," which I intend commencing immediately, and which is to be entirely got up by Messrs. Reeve and Co. Natural History Lithographers, London, Mr. Walter Elliot, M. C. S. and myself have also in a state of forwardness a work to be entitled 'Illustrations of Indian Zoology' to be more especially devoted to mammalia, reptiles and fish, and the occasional loan of a specimen in any of these departments would be highly valued.

I need not say that the source of such drawings would be always gratefully acknowledged, and I am confident that both of the works now in contemplation will be considered more valuable from the aid of your museum, which I hope you will use your own influence to obtain.

May I further request that you will be good enough to propose me as a member of the Asiatic Society of Bengal.

Madras, 30th September, 1845.

T. C. JERDON.

Resolved that the Secretary be authorised under proper restrictions to comply with this request.

The Sub-Secretary presented a translation, with a lithograph prepared for the Journal, of an extract from the "Estado de las Yslas Filipinas por Don Sinibaldo de Mas, Madrid, 1843," relative to the alphabets of the Phillippine Islanders.

The Sub-Secretary also exhibited to the meeting a MS. plane chart of the courses and distances made by the brig Charles Heddle, while scudding in the hurricane of the 22nd and 27th February, 1845, to the north-east of Mauritius, and developing a series of spirals by the conjoined action of the hurricane and its storm wave. He announced that the memoir to this curious chart was in forwardness for publication.

REPORT OF THE CURATOR MUSEUM OF ECONOMIC GEOLOGY AND GEOLOGICAL AND MINBRALOGICAL DEPARTMENT.

GEOLOGICAL AND MINERALOGICAL.

Our active member and contributor Lieut. Sherwill, B. N. I. has forwarded to us seven boxes containing a fine series of specimens illustrative of the Geology of Behar, of which

his map and note will, as he advises, follow as soon as completed, a portion of the hilly country to the west of Rhotasghur still remaining unsurveyed. Lieut. Sherwill has also sent us specimens of the curious sandstones, of which his descriptions and figures will appear in the 163rd No. of the Journal.

Mr. Rechendorf, a German gentleman educated as a Mining Engineer, has obliged us with a paper on the Geology of upper India, which he has had some extensive, though brief opportunities of examining, having travelled up from Bombay to Ferozepore, and then by the hills before visiting Calcutta: this paper is now in the hands of Dr. Roer, who has kindly undertaken its translation.

Capt. Abbott, B. A. has also obliged us with a paper on certain specimens of splintered agates found in clay strata bordering on the Nurbudda, the origin of which is probably to be sought for its the fissures of the rocks, occasioned by movements of upheaval or subsidence; unless indeed we admit of any glacier agency so near the equator, or that the agates might possibly be fractured by the agency of torrents and the grinding of boulders in them, or at cascades, and subsequently carried by inundations with other debris to form part of the till deposited on the banks of the river.

By Mr. Rechendorf, I have forwarded to professor Ehrenberg at Berlin, twenty-four bottles of our river water, being twelve bottles taken (one in each month of the year) in the middle of the river at Calcutta, and at Burisal, so as to enable him to compare the infusorize of the sediments of the great tropical rivers with those of European ones.

Major General Cullen, resident at Cochin, forwards us from Cochin a small box by dawk, and since two chests by sea, of a limestone deposit from the Breakwater at Cochin. I have not yet had time to examine the specimens. The General's letter is as follows:—

#### H. PIDDINGTON, Esq.

My DEAR SIR,—I do not know if, in my last note to you, I made any mention of a discovery I had recently made in this vicinity of a calcareous deposit, I believe the first instance of the kind that has yet been noticed on any part of the coast of Malabar though frequently searched for. Indeed, the absence of all calcareous deposit below or along the top of the ghat has become almost proverbial.

I have met with traces of a calcareous infiltration—in the seams of a kind of greenstone rock near Trevandrum, but that is the only other instance I have heard of,—towards Cape Comorin kunker appears, and you know parhaps that that deposite abounds on the east side of the ghat at Tinevelly. Captain Newbold I believe found nummulite nodules somewhere between Mangalore and Sedashigheer, but not I believe, in situ, probably Pattimar ballast. My natice was first drawn to the present deposit by the excavations made for canal work. Some small flat pieces of stone were brought to me, some of them of rather singular form. I immediately perceived they were calcareous. I ordered the search to be continued, and a little deeper they came to large thick slabs of a coarse, dark, greenish limestone, at first supposed to be addisintegrating greenstone or hornblende slate. It, I however immediately ascertained to be limestone also. Instead of blue stiff mud or clay, the more general stratum, the soil here was a dark greenish sand, in fact the detritus of the slabs, a calcareous sand, a most singular and interesting appearance. I fancied that the slabs had the usual direction, N. W. and S. E. and I ordered corresponding search. I recollected

<sup>\*</sup> At first the existence of limestone here appeared to me so very problematical, that I could hardly believe it. in situ, I suspected that the slabs must have been remains of some

some mud (indurated) deposit on a sandy shallow off the coast, eight or ten miles north of Cochin. I set people there also and I have been most successful—I have found no more of the slabs, because if any they have not gone deep enough, i. e. to five or six feet, but I have found them to abound in the upper stratum of loose detached pieces and nodules, at a depth of one and half or two feet in the mud or clay on the shores of the Breakwater. All these have the strongest resemblance in form to fossil bones.

I have packed up in a box a small collection of all the varieties I have yet found, and dispatched it lately to Madras to go by an early steamer to Calcutta. The enclosed sketch of the appearance of these bone-like fossils? is by a medical friend who examined them when passing Trevandrum. I have more recently collected a great number more—and will forward them to you if desired.

I will also now forward to you by post a few small specimens, with a little sketch of the tract where they are found, together with a rough drawing or etching of some of the slabs and more remarkable nodules.

The more compact limestones, as I have already noticed, are found on the shores of the Breakwater. On the sea beach are found abraded corals, and small flat pieces of stone, some very much like the laminæ of the large massive slabs of the canal, others a conglomerate of minute shells, gravel, sand, and the small grains or particles of the coarse limestone. Indeed the particles of the coarse limestone seem to form the cement.

The sea beach varieties are found at upwards of forty miles north of Cochin, but they do not appear to extend above three or four miles in a southerly direction, all of which seems to strengthen the supposition that the deposit is limited, forming a bed or stratum conformable to the general direction of the primary rocks of this coast.

One of the first objects of my seeking or discovering this limestone was to try its properties as a cement, and it seems to possess all the essential of the most perfect water cement. Properly prepared and formed into a small ball without sand or any thing but water, if thrown into water it hardens in a few minutes, in the air it hardens almost instantaneously. It answers perfectly to Col. Pasley's description of the best water cement. We have no. experience here however, and I shall therefore send some for experiment to Madras, to Capt. Smith of the Madras Engineers.

This is a hasty and imperfect account, I will endeavour to send you a more correct one hereafter.

Cochin, July, 1845.

W. CULLEN.

- Sketch
- 1. like the Scapula or shoulder blades.
- 1. like the Femur or thigh bone.
- 1. like Os Innominata, or one side of the Pelvis.
- 2. short ends like the Tibia and Fibula of hind legs.
- 2. ditto like the knee bones of the fore legs.
- 1. short piece like the great Trochanter or end of the thigh bone forming the hip joint.
- 1. large piece (hollow) apparently petrified wood.

building, a discovery perhaps equally interesting, but I have never heard of that stone used in building in Malabar. I was delighted therefore on finding traces of it in the prolongation of the line.

#### H. PIDDINGTON, Esq. Calcutta.

My DEAR SIR,—I fear you will think me troubling you more about these Cochin limestone deposit than they deserve. I am now sending you by the Brig Fortitude two more boxes of specimens. I shall now have furnished you with sufficient samples, and will not trouble you again.

I have sent you some very small specimens by post, and a small box will reach you via Madras probably by the next steamer.

I shall feel greatly obliged by any remarks on them you may be so good as to favor me with.

W. CULLEN.

Cochin, 7th August, 1845.

We have several notices of earthquakes, and I had indeed proposed, but was prevented by illness, to collect all those which appeared in the newspapers for publication.

The following are however of so fauch interest that they should not be passed over. Extract from a letter from Lieut. Blagrave, dated Kurrachee, 16th October.

"Native letters have been received from Sinkpul, the frontier town of Kutch Booj, stating, that two shocks of an Earthquake were felt there on the 19th of June, and that on the 25th fifteen distinct shocks were felt; no mention is made of any loss having been sustained. Rain had not fallen up to the 27 ultimo; this is an extract from the Kurrachee Gazette. I have since heard that an immense body of water has been forced for many miles in all directions over the Runn, and that the old tower of Sindree Fort has been nearly destroyed by it. I shall try and get leave to visit it, and will if I go send you any thing that I may find there."

The next notice is from our active member Capt. Hannay, Upper Assam.

#### H. PIDDINGTON, Esq.

My DEAR Ser, - You will no doubt have several notices of the late earthquake in the Assam valley, and I have now the pleasure to send you my notes on it.

Debrooghur, 26th July, at 8 minutes past 2 p. m. rather a severe shock of an earthquake the motion a trembling, with distinct jerks towards the end of the shock, which lasted about a minute.

"This shock was accompanied by a loud rumbling noise which was heard, and the advance of the rocking motion almost perceptible at one end of the Bungalow before it was felt throughout the house, so that the approach of the shock was (apparently) gradual, and it was neither violent nor sudden. The direction appeared to be from west to east but more likely S. W. to N. E. the direction of the valley."

For some days previous there had been neavy pain—on the evening of the 25th about 8 r. m. a brilliant meteor passed from south to north on the Heavens, and burst behind a cloud. The sky that evening had a singular appearance; although cloudy, the moon seemed to stand out beyond them—unusually hot weather succeeded this earthquake when heavy rain fell about the beginning of August, after which succeeded some days of hot and oppressive weather. On the evening of the 4th instant we had heavy clouds and lightning in the S.W. which cleared off. On the evening of the 5th there was the same appearance, the clouds being heavier with lighting all round the horizon; and early on the morning of the 6th we had a heavy storm of wind from south and S. W., the sky during this day was cloudy and the air comparatively cool. Between 11 and 12 r. m. we had a slight shock of an earthquake, and towards the morning of the 7th a heavy S. Wester with

rain; about 4 P. M. on the 9th another heavy storm of thunder and lightning and rain, and with an interval of two days of oppressive heat, another fearful storm of thunder and lightning at 2 P. M. on the morning of the 12th inst.

The season in Upper Assam has been excessively hot. Heavy storms of thunder and lightning with heavy rain, succeeded by the hotest sun that has been felt for many years; sickness however is not more prevalent than usual amongst the natives of the country.

N. B. The Earthquake of the 26th was felt on the Burmapootur, at Gowhatee, Sibsagor and Jeypoor within a few minutes apparently of 2 r. m. At Gowhatee it was an unusually severe shock, that of the 5th or 6th appears to have been also felt there.

H. HANNAY.

Jeypoor, the 22d August, 1845.

Lieut. Blagrave has also sent us a drawing, and promises specimens, of some fossils from Kurrachee.

To Major Wroughton, Acting Surveyor General, we are indebted for a highly curious fossil, both in itself and as to its locality; being he thinks a Madrepore, but I am disposed to think it possibly (though no articulations are visible) part of an encrinite of large size? which is from between the Neetee pass and Gortope, at 15,000 feet above the sea! and it is moreover evidently part of a boulder; I think this is the first record of any fossil of either of the families alluded to above (Zoophyta or Echindermata) being found in the Himalaya?

#### MUSEUM OF ECONOMIC GEOLOGY.

Mr. Rechendorf, to whose obliging contribution in general Geology I have alluded above, has also favoured us here with a paper (printed in number 163) of singular interest on the Copper mines of Pokree and Dhanpoor, in Kemaon, which is of much importance, as fully corroborating the views which have been held by other practical men, and especially by Mr. Wilkin, who indeed complained to me that the means of expenditure placed at his disposal were so small that it was impossible to make any fair experiment.

To Welby Jackson, Esq. B. C. S. we are indebted for a highly interesting paper on the iron ores of Bheerboom; with a good set of specimens illustrative of it.

From Kyook Phyoo our attentive friend, Major Williams, sends us from Capt. Clarke a specimen of an argillaceous shale, perhaps from the Mud Volcanoes, which is discoloured on one side, apparently by the action of heat; and also a small ingot-shaped piece of metal, which on examination proved to be pure zinc with a minute trace of iron. The native who brought it to Captain Clarke says "there is plenty of it," but as zinc has never yet been found in the metallic state we must suspend our judgment of the matter till we have further notice of the locality, which I have written for.

Captain Jenkins forwards us from Assam a paper with specimens by Captain Hannay, to whom I had when here given a specimen of the true Asphalte, requesting his attention to the various deposits known to exist in upper Assam, with the hope of finding there a true Asphalte or some substitute for it.

Captain Hannay's paper and specimens are of the very highest interest, and as soon as I have examined the latter I shall further report on it.

Mr. Martin, Executive Officer in Assam, has sent us a farther supply of 20 specimens of woods from that country, of which the list is as follows:—

### Proceedings of the Asiatic Society.

List of Woods, &c. being a Continuation from Assam.

XXV .- Bhoza.

XXVI.-Azar.

XXVII.-Ooiceam.

XXVIII.-Kutal.

XXIX.-Poma:

XXX.-Gomarce.

XXXI.—Pasulee.

XXXII.-Sileka.

XXXIII.-Owhee.

XXXIV .- Poddo Cedar.

XXXV.-Bhoj.

XXXVI.—Kahtoleah Bolah.

XXXVII.—Boon Bogree.

XXXVIII.-White Holong.

XXXIX.—Cedar.

XL.—Oohriam.

XLL.-Bon Choong.

XLII.-Dhop.

XLIII .- Red Holong.

XLIV .- Long Cheng.

XLV .- Sonaloo.

He has also sent in the box some pretty specimens of Magnetic Iron sand in layers, interleaved in fact, with sandstone, from the Luckee Dowar lower range of the Garrow Hills.

Mr. Watkin, who superintends the Raneegunge Coal mines, having visited the Museum about a year ago, and being kind enough to offer his services, I gave him some tin boxes arranged for receiving specimens of the vegetable impressions of their coal shales. The boxes, which it appears have remained in Calcutta for some six months, have now reached us with a good assortment of the impressed shales which are of great interest.

Our Secretary has sent us a lump of clay impregnated with quicksilver, found on diging away some ruins near the old Mint, no doubt the produce of some broken package in the olden time.

From Mr. Higgins, an officer of the steamer Fire Queen, we have received by Mr. Blyth, a lump of black concretion which was taken from one of the flues of the steamer boilers at a spot where it was leaky. It proves to be nothing but a mixture of salt from the evaporation of the water oozing through the leak, and the carbonaceous matter of the smoke, but it is so far curious that it shows, like the sparks at the top of the funnel, the very imperfect combustion of the fuel, which is here in coarse grains, and, it may be, would account for some cases of explosion.

H. PIDDINGTON.

For all the foregoing communications and presentations the best thanks of the Society were accorded.



# श्रीश्रोदुर्गा ॥

# एसियाटिक् सोसाइट् संस्कृत नागराक्षर ॥

महाभारतं आद्यन ४ खण्ड	80
महाभारतीयार्चगतसूचीपंत्र आद्यन	70 m
४ खण्ड	έ
नैषध आद्यन सटीक् १ खण्ड	ξ
हरिवंश आद्यन १ खण्ड	ч
राजतरङ्गिणी आद्यन १ खण्ड	ч
मुश्रुत आद्यन २ खण्ड	t
मूची पुस्तकं १ खण्ड	9
लासनेन रचितं सर्व साधारण	8
गीतगोविन्द.१ खण्ड ':	211
यज्ञद्वयधः १ खण्ड	2211
शकन्तला नाटक	90

نهرست كتابهاي عربي وفارسي مطبوع كد در خانه اشيائك سوسيتي حسب تفصيل الذيل بقيمتهاي مناسب براي فروخت موجود اند

اسامي كتب قيمت فتاوى عالمگيري مرتب بشش جلد في جلد هشت روپيد عنايه جلد ثاني وثالث ورابع في جلد ... هشت روبيد شرائع الاسلام ... ... هشت روپيد انيس المشرحين ٠٠٠ ... بنے روپید جوامع علم رياضي ... ... چهار روپيه اصطلاحات صوفيه ... ... پنے روپید .... خزانة العلم ... ... مشت روپيه ... تاريخ نادري ... ... هشت روپيد ... فهرست كتب كالج فورت وليم واشياتك سوسيتي يكروپيد

## JOURNAL

OF THE

## ASIATIC SOCIETY.

Review of L'HISTOIRE DU BUDDHISM INDIEN, par E. BURNOUF. By Dr. E. ROER.

It is with great satisfaction, that we hail the appearance of a work, which will, we suspect, form an epoch in our knowledge of Buddhism. Seeing the name of the author at the head of this "Introduction to the History of Buddhism" important results were to be expected from his knowledge of Sanscrit and of Pali literature, but we did not anticipate, that a great part of his researches was based on Sanscrit sources. It is indeed singular, that our first information about Buddhism should have been derived from secondary sources; from the Burmese, the Moguls, the Chinese, &c. and should only gradually have returned to its main spring. Our first acquaintance with Buddhism was in fact not of a kind to invite research: the mixture of extravagant fables, apparent historical facts, philosophical and religious doctrines was so monstrous, that it seemed to defy every attempt to unravel it. There were architectural monuments in abundance, which bore witness to high ancient civilization among Buddhist nations, but in referring to their traditional or written records, which alone could give language to those relics, enquiry was startled at their incoherence and inconsistency. The researches of Abel Rémusat, especially on the Buddhist writings of the Mongolian nations, threw the first light on these mysteries. He was closely followed by F. J. Smith, and from Chinese authorities by No. 167. No. 83. NEW SERIES.

Klaproth, Landresse, A. C. de Körös, whose indefatigable zeal and perseverance opened new sources for the history and religion of the Buddhists in the literature of the Tibetans. About the same time the excavations of Buddhist monuments in the Punjaub and other places, secured a geographical basis for the empires of the Buddhists, and the coins found in the topes, with the decyphering of their legends by J. Prinsep, brought to light a series of facts, which were of the highest importance to true history. All these results were eminently corroborated and illustrated by an ancient Buddhist work, written in Pali, the "Mahawanso," of which a translation into the English was published by the Hon. Mr. Turnour. From a different quarter of India the numerous communications of Mr. Hogdson on Buddhism in Nepaul, and his discovery of an immense number of Buddhist works, written in Sanscrit, excited the highest interest; but a critical examination of these books not having been given, no dependance could be placed upon these illustrations otherwise so valuable. The present work of Mr. Burnouf is the result of such a research, and through it we have returned to the central source of the Buddhist writings, from which all others, with exception of the Pali, are only radiations. It owes its origin to a number of Sanscrit manuscripts (80) which Mr. Hodgson collected in Nepaul, and which, with his disinterested liberality in promoting the cultivation of Oriental studies, he presented, about the end of 1837, to the Asiatic Society of Paris; a liberality, the first fruit of which is this remarkable work of Burnouf, who does not fail to do full justice to the noble disinterestedness of Mr. Hodgson. There are very few scholars capable of undertaking a research into the materials. As a fortunate combination of circumstances had concentrated at Paris all the first and secondary sources for the history of Buddhism, a man was required who united to a profound knowledge of the ancient languages of India, an acquaintance with the modern languages and literature of the Buddhists, the critical tact of the philologist and historian, and the comprehensive grasp of the philosopher, qualities, which in E. Burnouf are most happily blended together. It is certainly not an easy task to go through eighty large manuscript works, written in a barbarous language, made often unintelligible by the ignorance of the copyist, to analyse the contents of all, to bring them in their true chronological order, to compare them with the documents of other nations, written

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in a different language, and lastly use them as sources for the history, religion, and philosophy of the Buddhists.

The Buddhist religion claims in many respects a peculiar interest. The changes it has undergone are most remarkable. Having overcome the religion of the Brahmans on its own ground, having swayed by its kings the greater part of India, it has been banished from its native soil so entirely, that it is almost forgotten there by the bulk of the population, while its followers in other parts of the earth are more numerous than those of any other religion. It is an undeniable fact, that a great part of mankind were humanized by it, and that for the civilization of central and western Asia it has done the same, as Christianity has for the barbarians of Europe.

But a higher interest is connected with its history for the philanthropist. Has Buddhism been able to produce such a religious revolution in India? Has it been able to overcome the intellectual barrier with a great number of the Hindoos, the tenacious adherence to their religious impressions? We may also perhaps be able to exercise a similar influence on the Hindoo mind, to break the instinctive resistance against a religion which reveals the true aim of mankind, and is connected with all the progress which mankind has made in science, in art, and in the true spirit of government.

And in this respect the annals of Buddhism should be attentively studied. Truth in itself alone is not sufficient to eradicate errors, which a long habit has accustomed people to consider as their most sacred inheritance; the mind of man being not prepared for a religious or even a scientific truth, will reject it. As regards the propagation of religious truth among a people, its character, habits, institutions should be intimately known, before a lasting impression can be made on them. The Buddhist annals are in this respect especially instructive, showing the means, by which they succeeded in converting a people, every institution of which is calculated to perpetuate its religious associations. Among the many important results, which are the fruit of Burnouf's researches, we will here notice one, which appears to us of immense importance to the future studies of Indian antiquity; it is, that there is established beyond doubt the higher antiquity of Brahmanism; and before we enter into a description of the work itself, we beg to be permitted to consider this object from another point of view than that in which Burnouf regarded it, in the hope, we may contribute to remove some prejudices, which obstruct not only the study of the history of Buddhism, but of all other religions.

The question, whether Buddhism or Brahmanism be the more ancient religion, has not yet been decided to general satisfaction, though there should not be any doubt about it among those who have studied Indian antiquities. The incertitude, which still prevails on this subject, appears to originate in the opinion of men, who not paying sufficient attention to a most authentic document,—the ancient Sanscrit literature, allowed their judgment to be swayed by modern Buddhist sources. And even these were not critically examined by them, as the Buddhists themselves explicitly, as well as implicitly, acknowledge the higher antiquity of the religion of the Védas.

It is not difficult to discover the cause of this predilection for the antiquity of Buddhism. We have above remarked, that the religion of Buddha, as derived from more modern documents, offers an inextricable web of history, legends, religious and philosophical tenets, which appear to some, to have a close affinity to Christian doctrines (for instance, to the dogma of the Trinity); to others, with the assertions of some ancient Grecian philosopher; in a word, the apparent depth of some opinions, combined with the apparent want of historical documents, throws it back also into the depth of time. There is with many persons inclination to interest themselves in every thing which bears the semblance of remote antiquity. An event that disappears in the mists of time, has for them an enchantment which the most excellent historical statement of the real connexion of cause and effect would fail to excite, as it thus would be encompassed in the notion of every-day phenomena.

The Buddhists themselves, although in sad contradiction with their own statements, have always shown an inclination to push back as far as possible the origin of their doctrine, or in other words, to pronounce their religion without beginning and end, a proceeding, which is quite in accordance with their position. The question of their opponents, why Sákya Muni did not appear in any former period, was cut off by the doctrine, that the universe always is under the government of a Buddha. This assertion however well it accords with the wishes of the Buddhist, has not the least foundation in the eyes of the critic.

We willingly admit, that Buddhism has for the critic and historian a peculiar interest, but of an opposite kind; which is, that a religion, which, as regards even its origin, appears to belong to an advanced state of society, and which in all its stages manifests elements of a doctrine intended to be propagated,—that such a religion should at the same time recoil into the darkness of a primeval period. It is the peculiar object of the enquirer to raise the veil which was, as we may safely assert, woven in after days; like as with the pretensions of Brahmanism to indefinite antiquity, made at a more recent period.

On the other hand we may assert, that the darkness into which the origin of many religions is plunged, cannot be removed, because such darkness is, as it were, cause and consequence of their origin.

A religion which is produced by the human mind, without being dependent on former religious opinions among a nation, but is rather the commencement of its religious convictions, has neither consciousness of itself, nor falls within the range of history. There is the same obscurity with regard to it, as with regard to language, the origin of which we may comprehend as a necessary effect from general causes in human nature, without being able to trace it by historical documents.

We now assert, that Buddhism is no primitive religion, but one of those, which are founded on the development of preceding religious opinions.

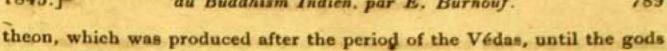
Religion has the same object with philosophy, which, however, is attained by either in a different way; religion perceives its object by belief, while the other endeavours to realize it by knowledge. Both depend on the idea of infinity. As certainly as man has the idea of finite things, so has he also the idea of an infinite nature; both are correlate ideas, and religion therefore is founded on the nature of man. By religion we believe in our connection with infinite power; by philosophy, we attempt to trace it by a succession of arguments. Being both alike in their object and commencement, they must also have a similar development, or the steps which the one has to go to the goal of its perfection, are represented likewise in the other.

Philosophy in its origin has two characteristics; first, it is simple, or the object of knowledge is perceived in its simplest relations; and, secondly, all its principles as well as its explanations are material. The

material causes and explanations are not even comprehensive, but are limited only to certain phenomena of nature. The next step in the march of reason, is to collect all these phenomena in one view, as well as to reflect upon the forms, in which they appear in our mind. When this circle of natural causes, of their being reduced to one and the same (material) cause, and their mode of connection with our perception has been completely passed through, when by this process the various stores of learning, and a progressive power of reflection and reflected notions have been produced, the mind will be perceived in its contrast with material nature, that is to say, as perceiving, as comprehending a variety of objects in one and the same view. This stage of philosophical reflection is impossible, without being preceded by the former,—the materialist consideration. At first, however, the more obvious acts and faculties of the mind are only perceived, that is to say, in its difference from nature, and only when they have been examined, are the various manifestations of the mental activity submitted to investigation; the mind appears then as a moral agent, and it is then the highest destination of mankind to realize a hierarchy of moral ends.

It is evident, that in this exposition, the assertion is not included, that on the first stage of the philosophic development of the human mind, no notions of mental acts should have existed; on the contrary, they undoubtedly existed; for it is in the nature of the mind to be conscious of its acts; but this consciousness is first found in an unreflected perception; as a clear, well defined notion it cannot exist, until by a series of opposite notions, the nature of the mind becomes manifest. The same law exists, as regards the perception of moral ends, which, however, is not necessary here further to discuss.

Religion follows the same steps in its development. Powers of nature, or objects of external perception, have been first worshipped as the gods of man. They are, for instance, the elements, water, earth, fire, ether, or phenomena of short duration, though of overwhelming power, as the clouds, thunder and lightning, &c.; or objects on the sky, as sun, moon and stars. In the Védas prevails an adoration of the elements and the starry sky; the Greeks previously to the worship of the Olympian gods, adored Uranos (sky), Gaia (earth), Chronos (time), &c. In a later period qualities of the mind are attributed to the gods, as we find the gods of Olympus, or the gods of the Indian pan-



are considered as the moral rulers of the world. Let us now apply these criteria to the religion of Buddha to see, whether it belongs to the primitive religions, or to those which can only arise in a more advanced age of mankind. First, its views of the world are not simple; we find therein a developed theory of the material elements, of an eternal circle of life and death, of a necessary connection of causes and effects; of infinite spaces and times, &c. together with almost all the gods of the Brahmans. Further, the view of the world is not material, but there is clearly perceived the difference between mind and matter, a doctrine of the origin of all mental and material elements, from one element, which transcends the perception of our senses, and which in fact is the void, the nothing, a view which undoubtedly requires a far advanced abstraction. Further, as regards the mind, many different stages of its development are distinguished, and it is explicitly stated, that it is the destination of man to pass through all these stages, to liberate himself from all the trammels of nature, and to aspire by his own efforts to the highest degree of spiritual existence. Lastly, the moral element prevails in Buddhism; it is essentially a religion, in which the highest object is Dharmma, the realization of the moral law by a finite being, as the only means of receiving true liberation from the evil of life, and obtaining the state of a Buddha.

This explanation goes far to prove, that Buddhism is not simple, that all its elements are based on a previous development, and we may therefore safely assert, that it is not a primitive religion, but the result of religious ideas, previously cultivated in the people; or, with one word, Buddhism belongs to history, and if its documents be not lost, we must be able to trace its origin. The native country of Buddhism is India, and as there was no other religion but Brahmanism, this must have been its parent. If this be true, it cannot be difficult to show that form of Bráhmanism to which it owes its existence. We however, conclude here this exposition, which we made only for the purpose of contributing to settle a question which has too long been a matter of discussion to Oriental scholars, and return now to our immediate object.

As we already observed, Burnouf's work gives the historical evidence of the connection between Brahmanism and Buddhism. It introduces us into the very circumstances from which Buddhism arose.



The more we advance in the perusal of his book, the darkness as to the mysterious origin of Buddhism is gradually dispelled, and we commence to get an insight into the very motives of its founder and its first apostles; in a word, we recognise in it a work of human intellect.

Mr. Burnouf endeavours first to establish the place, which the Sanscrit books of Nepaul claim to occupy among the Buddhist literature in Asia, and after a careful comparison of the great Tibetan collection of Buddhist works, of which Mr. A. C. de Körös gave a detailed and able analysis in the Journal of the Asiatic Society, of Mongolian and Chinese Buddhist works with the Nepalese collection, he comes to the conclusion, that all of them are translations from the Nepalese books.

It is a fact, he says, proved now to evidence, that most of the sacred books of Tibet, Tartary and China, are only translations of the texts, discovered in Nepal, and this single fact marks positively the place of these texts in the series of documents which the Asiatic nations have furnished for the general history of Buddhism.

Ancient Buddhism has, according to the author, only two true sources, the Sanscrit works of Nepal, and the Pali collection of Ceylon, of both of which he made use in his researches.

The results of them are presented in the following order. His work is divided in three parts or memoirs. The first memoir is to describe, according to the Nepalese tradition, the Buddhist collection, discovered by Mr. Hodgson. For this purpose it is to enter into the necessary details concerning the great divisions of the sacred writings, admitted by the Buddhists of the North, by which it will be decided, whether they had been written at different periods or not. This memoir will somewhat dispel the obscurity of the first times of Buddhism, and at least decide the long controverted question of the comparative antiquity of Buddhism and Brahmanism. The second memoir, which will be published in a subsequent volume, is to examine the Pali books of Ceylons and the third, to compare both collections and the traditions in the North and South concerning them. From this, says the author, will result the conviction, that there are two editions of the Buddhist works, the difference of which generally consists less in the matter than in the form and classification of the books; and secondly, that the true elements of ancient Buddhism must be looked for in what is common in either edition.

We now follow Mr. Burnouf into the description of the collection of the Nepalese works.

The Buddhist collection of Nepal, he says, is composed of a great number of works, the titles of which announce treatises of very different kinds.

Mr. Hodgson has published two long lists of these titles, which may be completed from the analysis which C. de Körös has given, of the Tibetan collection.

We do not possess in Paris all these works, but the eighty Buddhist volumes, which we owe to Mr. Hodgson, probably contain the most important part of the religious collection of Nepal.

The books, which are now extant, are divided into three classes, under the collective title Tripitaka. They are the Sútrapitaka, or the discourse of Buddha, the Vinayapitaka, or the discipline, and the Abhidharmmapitaka, or the manifested laws, that is the metaphysics. This division, justified by the texts, is at the same time one of the bases of classification of the Kah-gyur, and is also familiar to the Chinese Buddhists, who explain it by the three words: sacred books, precepts, and discourses.

The word Sútra denotes in the ancient literature of the Brahmans short, and obscure sentences, which contain the fundamental rules of the Brahminical sciences from grammar to philosophy. Though the word in this application is not unknown to the Buddhists, they use it also in another sense, and the treatises, which bear the title of Sútras, have a very different character from those known by this name in the Brahminical literature. The Sútras, according to the Nepalese authorities, quoted by Mr. Hodgson, contain the sayings of the Buddhas; they are therefore often called "Buddha Vachana," the word of the Buddhas, or Múlagrantha, text-books. These books are ascribed to the last of the Buddhas, viz. to Sákyamuni, and in consequence occupy a very elevated place among the Buddhist literature in Nepal. The Sútras by their generally simple form and language, preserve the visible trace of their origin. They are dialogues, relative to ethics and philosophy, in which Sakya plays the part of teacher. Far from presenting his thoughts under the concise form, which is so intimately connected with Brahminical instruction, he commits repetition, which, though fatiguing, bears the character of real preaching. There is a wide abyss between

his and the Bráhminical methods; instead of the mysterious doctrine, entrusted almost secretly to a limited number of hearers, instead of formulas, the studied obscurity of which seems as well to discourage the penetration of the disciple as to excite it, the Sútras present round Sákya a numerous assembly, composed of all those who desire to hear him. This vast difference is founded on the essence of Buddhism, a doctrine, in which proselytism is the characteristic feature; which proselytism, however, is only the result of the universal benevolence and charity, which inspire Buddha, and which at the same time are the cause and the end of his mission on earth.

The title of the second class, Vinaya, signifies discipline. The Chinese Buddhists understand this term in the same way, and Mr. Rémusat defines it, the precepts, the rules, the laws or ordinances, literally the good government. The signification of this term is therefore clear, but by a singularity, which appears difficult to be accounted for, the collection of Mr. Hodgson does not present, with the exception of some short treatises on religious practices of little importance. works which belong to the class Vinaya. Why then is not the class Vinaya represented in the collection of Mr. Hodgson? The attentive examination of some volumes of the Nepalese collection, compared with the works, mentioned in the Tibetan Kah-gyur, solves this difficulty. In studying the analysis made by Csoma, I found there a certain number of treatises with titles, which also occur in the Nepalese collection. These treatises in general belong to the same class in either collection, and a work which, according to the double authority of the Nepalese tradition and of the manuscripts, is called Sútra, is classed according to the Tibetans, under the category of the Mdo, that is to say the Sútras. The collection of Mr. Hodgson, contains a great number of small treatises under the title Avadana, which has as large an application as the title of Sútra, and I even believe, that the number of Avadanas is greater. Several of these treatises, however, have exactly the form of Sútras, and a strict classification would compel us to separate them from the works which bear the title of Avadana, but do not possess the character of a real Sútra.

The third division, the Abidharmma pitaka, contains in part the metaphysics, and in general the opinions, of the Buddhists concerning all that exists.



This classification of the books of Sákya, as it is found in the commentary of the Abidharmma Kósha and in the analysis of C. de Körös, appears to give the same authority to all the books. A more attentive examination, however, shows some differences between them. Thus I find some passages in the Abidharmma Kósha from which it may be inferred, that the Abidharmma does not directly emanate, nor with equal title, from the preaching of Sákya. The author of the above-mentioned treatise says for example, expressly, the book, which contains the metaphysics, is not derived from the word spoken by the Buddha.

Mr. Burnouf in his more special examination of the Sútras, has chosen two fragments of the Nepalese collection, known under the title of Divya avadána, in which (fragments) he recognises the characteristics of the Sútras. The first refers to the period of Sákyamuni Buddha, and reveals some proceedings of his preaching; the second is a legend of a mere mythological character, which Sákya relates, to show the advantage and recompense of giving-alms.

Sákya recommends in them the practice of the duties, which are the objects of his doctrine, and he shows the importance of them by the recital of the merits assigned to them, who act in accordance with them. He very often confirms his doctrine by relating events, which in a former life happened to him or to his disciples, admitting, as the Brahmans, that all beings are condemned by the law of transmigration successively to pass a long series of existences, where they obtain the fruit of their good or bad acts. Súcras of this kind are very similar to legends, strictly speaking, and in fact they differ from them only in external characteristics of no great importance. A Sútra always commences with this formula: "Lo, what I have learnt", while this formula is wanting in all the Avadánas which are known to the author. It must be also said, that the legend forms the basis and the appropriate matter of the Avadána, while it is only an accessory to the Sútra, and serves only to confirm by an example the instruction of Buddha.

The identity of the title which exists among all these treatises, the Sútras, the Mahayasa Sútras, and the Mahayaipalaya Sútras, announces at the first glance great similarities. The examination of the texts, however, does not fully bear out this presumption. A Sútra of the fuller or developed class is, as regards its form, a true, and real Sútra, it

commences and terminates with the same formula, and is, as the simple Sútra, written in prose, with a more or less numerous intermixture of versified passages. It is moreover dedicated to the explanation of some one or other point of doctrine, and the legends are also subservient to example and authority. But here ends the resemblance, and numerous differences will be found, which are of such importance as to render the classification of these two kinds of Sútras in the same category improper.

A simple Sútra as written in prose, a developed one in prose mixed with verses, and the poetical portion, is merely a repetition of what is written in prose in another form.

If these observations are true, we have a certain character by which to divide the Sútras into two classes, the first containing Sútras in the strict sense of the word, which are the most simple and probably the most ancient; the second comprehending the Sútras of fuller development, which are more complicated, and therefore more modern.

To this character is added another which separates, as regards the form, the simple from the great Sútras. The verses introduced into the former, do not differ in language from the body of the same treatise written in prose; verse and prose are both Sanscrit, while the poetical parts of the developed Sútras are either written in an almost barbaric Sanscrit, or confounded with forms of all ages, Sanscrit, Pali and Pracrit.

The Buddhist compositions of the North are not written in the epic style, the noble and at the same time simple style of the Rámáyana and Mahábhárat, nor in the rich and coloured language of the drama, nor also in the monotonous idiom of the Puranas, nor lastly in the compact, though a little obscure, prose of the commentators. Their style differs from all of them. The Sanscrit words have often acquired new acceptations. The language of the Buddhists has followed the march of their ideas; and as their conceptions in a marked degree, differ from those of the Bráhmans, so their style is very different from the learned language of the latter.

p. 105. The simple Sútras have also not the fastidious developments of the longer ones. There Buddha is generally placed in a central town of India, in the midst of an assembly of the religious, met to hear his preaching, and this assembly is sometimes increased by a mul tude of gods; in the great Sútras, however, the assembly consists of an exag-

gerated number of religious men and women, of gods of all classes, and of Bódhi-sattwas, while in the simple Sútras these latter never make their appearance.

p. 120. The idea of one or more superhuman Buddhas, and of Bódhi-sattwas, created by them, is as foreign to these books, as that of an Adhibuddha, or of a god.

p. 121. With all the attention I have bestowed on the simple Sútras, I cannot discover the least trace of that vast mythological machinery, where the imagination luxuriates through infinite spaces in the midst of gigantic forms and numbers. I have only found Buddhas, who are considered human beings, and of whom Sákya is the last, and I have not even found a passage in which the qualification of human Buddhas was not given them, while the conception of a Buddha, who should not be a man, having attained the highest degree of holiness, is beyond the circle of ideas, forming the foundation of simple Sútras. In one word, the Buddhas, previous to Sákya, have by no means the divine character of the Buddhas of contemplation, they are men as himself, the sons of Bráhmans or of kings.

p. 128. The simple Sútras illustrate a very important point in the history of Buddhism, viz. its connexion with Bráhmanism, on which point the merely speculative treatises preserve an almost complete silence. This circumstance alone suffices to establish the opinion, that these Sútras were composed, when both religions were cotemporaneous, in the same way as the presence of Buddhist anchorites in several Bráhminical dramas, proves the dramas to be written at a time, when followers of Buddha were still in India. The study of the Sútras, considered under this point of view, affords a new confirmation in favour of the opinion, according to which I place these monuments nearest to the preaching of Sákya.

It solves moreover in the most decisive manner a question, the discussion of which has been lately renewed, viz of the comparative antiquity of Bráhmanism and Buddhism, on the ground, that most epigraphic monuments in India belong to Buddhism, (page 129.) and not to Bráhmanism. Without entering into an examination of these monuments, which, I must say, are not yet studied with sufficient attention and critical discretion. I observe, that from the existence of ancient Buddhist inscriptions in Pali, and even from the priority of these inscrip-

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tions to Brahmanic monuments of the same class in Sanscrit, it may be inferred, not that the Pali is prior to the Sanscrit, which is impossible, not that Buddhism is prior to Brahmanism, which it is not less impossible, but that the regard for history and historical proceedings has been earlier displayed amongst the Buddhists than amongst the Brahmans. What more can, however, now be adduced in the presence of the formal evidence of the sacred texts of Nepal, in which the whole Brahmanic society with its religion, castes and laws appears? Can it be pretended, that the society the existence of which is borne out by these books, was originally Buddhist, and that the Brahmans, who afterwards became its masters, have borrowed from it certain elements to which they gave the form, in which we find them in the laws of Manu, or in the time of the Rámáyana and Mahábhárata? Or rather, is it imagined, that the names of the gods and the Brahminical castes, of which the Sútras are full, have been introduced all at once? And if so by whom? By the Buddhists perhaps, to give themselves the bonour of superiority, or at least of equality with regard to the Brahmans, which they could not retain in India; or perhaps by the Brahmans to assign their existence to a much more ancient epoch that it really was? In the first place, as if the compilers of the Buddhist books could have had any object in showing Buddhism separating itself from Bráhmanism, unless the Bráhmanism had existed in their time; or in the second place, as if they would have allowed the Brahmans to bring in by stealth their abhorred name among the names of Sakya and his disciples. We cannot escape the following alternative: The Sútras, attesting the existence of the Brahmanical society, are either written about the period of Sákya, or a long time afterwards. If the first, the society, which they describe, must have existed, because one cannot conceive for what purpose they should have given all the detail of a society, which did not exist, at the time of Sakya; if the second, one cannot better understand, why the gods and Brahminical personages occupy there so vast a place, because a long time after Buddha, Brahmanism was totally separated from Buddhism, and they had then only one common territory, that of polemical discussion and of discussion with the sword. Mr. Burnouf does not enter into all the indications which prove, that at the period when Sákya traversed India to teach his law, the Bráhminical society had approached its acme, but he notes two points, its religion and its political organisation.

The gods, whose names appear in the Sútras, are Náráyana, Siva, Varuna, Kuvéra, Brahmá, or Pitamáha, Šakra or Vásava, Hari or Janárdana, and Samkara, which is only another name for Siva, and Viswakarman. After them a number of inferior gods are mentioned, as the Dévas, Nagas, Asuras, Yakshas, Garudas, Kinnaras, Mahóragas, Gandhavas, Pisachas, Dánavas, and other good or evil genii. At the head of the secondary deities figures Indra, generally under the name of Sakra, or Sachipati, the husband of Sachi. His name is most frequently of all found in the Sutras and legends. There he generally appears before Sákya, with whom he has frequent conversations, and receives the name of Kaúsika, which title he has also in the Upanishads. His name figures with that of Upéndra, one of the most ancient epithets of Vishnu, even in the initiary formula, by which the legend expresses that an ascetic is come to the degree of an Arhat. The formula runs thus: "He becomes one of those who deserve that the Dévas with Indra and Upéndra, respect, honour and salute them." .

All these divinities are those of the people, in the midst of which Sákya lives with his ascetics. They are on the part of all castes the objects of a constant and exclusive worship. Their power is not considered absolute by the Buddhists, but inferior to that of Buddha.

p. 134. The evidence adduced goes far to show the connexion of the popular deities of India with the founder of Buddhism. It is evident, that Sákya found their worship already existing. He could pronounce, and the authors of the legends believe, that a Buddha, even in this life, has a superior power even to the greatest gods, although he has not created them.

The only support, which he could find in the minds of the people, was the universal belief, that great holiness is necessarily accompanied with super-natural faculties; but this was an immense support, and gave him the means of bringing to bear in justification of his mission the belief of bygone ages; this belief, however, is not exclusively divine, in its application; the Buddha was, as all other beings, involved in the eternally moving circle of transmigration; he had traversed several existences in the bodies of animals, of condemned persons, of men and of gods, having been alternately virtuous and criminal, rewarded and punished, but accumulating gradually merits which rendered him agreeable to

the Buddhas under whom he lived, and secured him their benediction. We then observe, that in this system Sakya takes every thing from himself and from the grace of a prior Buddha, whose origin is no more divine than his own. The gods are beings of a power infinitely superior to man, but also subject to the fatal law of transmigration.

It remains to examine, first the extent and the nature of what the Buddhists have borrowed from the Brahmans.

I quote as a single example of the results which may be expected from the study of the Sútras, that I have not found in the treatises of the Divya Avadána, the name of Krishna. The circumstance, that the name of Krishna does not occur in any of the treatises which I read, is in accordance with other signs, which show, that the religion, then existing in India, was different from that recorded in the Puranas.

The Sútras appear to me coetaneous with an epoch, when the Védas and the legends connected with them, formed the foundation of the religious belief in India. I do not support my opinion alone by the mentioning of the Védas, which is made on almost every page of the Sútras, but much more by the part which Indra, the hero of the Védas, plays in the Sútras, as he appears more frequently in the Sútras than all the other gods together.

The details given by the Sútras on the condition of Indian society at the period of Sákya's preaching, are still more numerous and important than those relating to religion.

p. 138. India was at that time subject to the reign of the castes, which were those of the Brahmans, Ksattriyas, Vaisyas, Sudras and Chandalas, not to mention some subdivisions of the inferior classes. The names of the castes are quoted every moment, and their existence is so well established, that it is admitted by Sakya himself and by his disciples, and does not become an object of special observation, unless it is made an obstacle to the preaching of the Buddha. The Brahmans appear most frequently, and their superiority over the other castes is uncontested. They distinguish themselves by their knowledge and their love of virtue. Some, arrived at the rank of Rishis, live in the midst of woods or in the caverns of mountains. They submit themselves to severe penances, recite the Brahminical Mantras and teach them to their disciples. Their sciences are the four Védas, and the practice of sacrifice.

Some Brahmans are employed by the Kings as Purohitas, or family priests, others as panegyrists to praise the Kings, for which they received presents.

The Ksatrya caste also existed at the time of Sákya, from which caste the Kings emanated.

140. The superiority of the two higher classes is generally acknowledged. They appear to have favoured the mission of Buddha; but not so all the Kings of central India; the King of Rajagriha persecuted him for a long time.

The Kings of the Ksatrya caste were in possession of an unlimited power, and it appears that no other obstacle was opposed to their will but the privileges of the castes. The ministers of some encouraged despotism by the most violent advices. The King of Kousala wanted money. His two ministers told him,—It is the same with a country as with grain of sesamum which does not give oil, unless pressed.

The King of Kousala gave on mere suspicion of enmity towards him, the order to cut off his brother's hands and feet. The existence and perpetuity of the castes depends, according to the Sútras, on a double condition, the one for each to marry a wife of his own caste, the other to maintain his hereditary profession.

Sákya's doctrine, which according to the Sútras is more moral than metaphysical, at least in its principle, was founded upon an opinion, which was considered as a fact, and on a hope, presented as a certitude. It is the opinion, that the visible world is in a perpetual change, that death succeeds life, and life death, that man, like every thing surrounding him; is passing through an eternal circle of transmigration, that he successively passes through all the forms of life, and that his place in the scale of living creatures depends on the merits of his acts in this world. The hope held out by Sákya, is the possibility to escape the law of transmigration, by entering into the state of Nirwana, that is annihilation. The definitive sign of annihilation is death; but a preliminary sign was given in this life to the man destined for this supreme deliverance; this was the possession of an unlimited science, which gave him a clear insight into the world; that is, gave him the knowledge of the moral and physical laws, or to say all in one word, it was the practice of the six transcendent perfections, viz. of alms, of morals, of science, of energy, of patience, and of charity. The authority, on which Sákyamúni based his mission, was entirely personal, and consisted of two elements, the one

real, the other ideal. The first was the regularity and holiness of his conduct, of which chastity, charity, and patience form the principal characteristics, the other his pretension to be a Buddha, and as such to possess superhuman science and power. He lastly presented himself as the saviour of mankind, and promised, that his doctrine would not be annihilated by his death, but would last a long series of centuries, and that another Buddha would appear to perpetuate it, if its influence should decrease. This is according to my view the most simple and primitive form, under which Sákya's doctrine is presented. Sákyamúni presented himself in the midst of a society, thus constituted, as one of the ascetics. who since the most ancient times traversed India, preaching morality, and the more respected by society, the more they appeared to contemn it; he even entered religious life, by placing himself under the tutelage of the When he had learned from his teachers all their knowledge, Sákya as all other ascetics, subjected himself to severe mortifications, and at first he did not distinguish himself from other ascetics of Brahminical race. It is also evident, that the philosophical opinion, by which he justified his mission, was partaken of by all classes of society; all classes believed in the fatality of transmigration, the adjudgment of rewards and punishments, and at the same time in the difficulty of escaping altogether the changing condition of a relative existence. As far as this point he was in no opposition to Brahminical society. Philosopher and moralist, he believed the greater part of the truths admitted by the Brahmans, but he dissented from them, when the consequences deducible from these truths and the condition of salvation came into question.

The means which Sákya employed to convert the people to his doctrine, were preaching, and according to the legends, miracles. The preaching is a means, worthy of attention, and is, I believe, never heard of before the mission of Sákya.

I have already in the first portion of this work insisted upon the difference of the Buddhist instruction from that of the Brahmans. The difference especially appears in the preaching, the effect of which was to bring home to the common understanding all the truths, which were previously the property of the privileged classes. It (the preaching) gives Buddhism a character of simplicity, and under a literary view, of mediocrity, which distinguishes it from the very profound manner of instruction of the Brahmans. It explains, how Sakya was induced to receive into the

number of his hearers, men who were rejected by the more elevated classes of society; it accounts for the success, with which his doctrine was propagated and his disciples multiplied; lastly, it reveals the secret of the radical modifications which the propagation of Buddhism must produce in the Bráhmanical constitutions, and of the persecutions which apprehension of changes necessarily brought down upon the Buddhists, when they should become powerful enough to endanger a political system, principally founded on the existence and perpetuity of castes. These facts are so intimately connected with each other, that the presence of the first (viz., the admission of the hitherto excluded classes) suffices to develop gradually the others as a matter of course. But external circumstances may have favoured this development; the mind may have been more or less well prepared; the moral condition of India in one word may have favoured the ardour of the people to hear the instruction of Sákya. It is this, which one can learn alone from the Sútras.

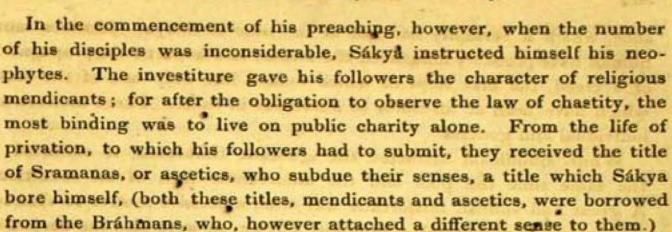
I have before observed, that the second means for conversion was the splendor of his miracles. With this means always correspond the sentiments of benevolence and of belief, which are awakened within the hearers by the influence of his virtuous actions in his former existences. It is therefore a favourite theme of the legendists; and in fact, there is not one conversion recorded, which had not been prepared by the benevolence, felt by the hearer for the Buddha and his doctrine. virtue of the Buddha, or to name it more clearly, this kind of grace, was the great motive for conversions, which would be otherwise perfectly inexplicable, it was the knot, by which Sakya connected the new religious light introduced by his doctrine, with an unknown state of past existences which he explains in favour of his preaching. It may be easily understood, what influence such a means must have exercised upon the minds of a people, among which the belief in the law of transmigration was firmly established. In starting from this belief, upon which he founded the authority of his mission, Sakya appeared rather to explain the past than to change the present: and it cannot be doubted, that he made use of it to justify the conversions, which the prejudices of the higher castes, to which he belonged by birth, condemned. But this motive of grace is entirely religious, and it is one of those, the employment of which the legendists have undoubtedly exaggerated, and must have exaggerated, when Buddhism had afterwards acquired an importance, which it certainly had not at the time of Sakya. Motives more human have probably influenced the minds, and favoured the propagation of a creed, the first steps of which looked like only one of the sects, which have been at all times so numerous in India. These motives are individual and general.

While Buddhism attracted the ignorant Bráhmans, it collected at the same time the poor and the unfortunate men of all conditions. A great and sudden misfortune was often a decisive motive to abandon the world and to become a Buddhist ascetic, so were also the despotism of the kings, and the fear inspired by their violence, and lastly, the greatness of rewards which Sákya promised to them, who embraced his doctrine.

The second class of the Nepal works, which bears the general title of Vinaya, or discipline, is represented by the Avadánas or legends. What has been before observed of the Sútras, also applies to the Avadánas. There are some among them which speak of Sákya alone and his first disciples, and these are the most ancient; there are others, which, while relating events that happened to Buddha, mention the names of persons, who lived a long time after him, as for instance, Asóka; there are, lastly, some written in verse, which must be considered as modern amplifications of more or less ancient works.

Another analogy between the Sútras and Avadánas is, that the discipline in the Avadánas is equally as far from a strictly dogmatical explanation as the ethics and metaphysics in the Sútras. The Sútras, says Mr. Burnouf, treat ethics and metaphysics not systematically, because they ascend to a remoter epoch, when those two elements of every religion had not yet obtained their full maturity, or to say it more precisely, they reproduce the various and easy style of Sákya, who did not expound, but simply preach. This is also the case with the Avadánas. The discipline has here no formal regularity, because they belong to the same period as the Sútras, and Sákya did not require the measured steps of a didactic exposition to establish a point in discipline.

To become a disciple of Buddha, it was sufficient to believe in him, and to declare to him the firm resolution to become his follower. The neophyte was then to shave his hair, to use as garb a kind of tunica and a cloak, made of yellow rags, and to place himself under the instruction of an older believer.



The first of all conditions, which those who wanted to become his disciples, had to fulfil, was belief; and this being found satisfactory, all others might be dispensed with. Excluded from his assembly were persons, affected with incurable diseases (as lepers) or with gross defects of the body; criminals, as the parricide, the murderer of his mother or of an Arhat; persons who had created dissensions among the religious, or who had committed one of the four great crimes of the Brahmans: persons under the age of 20 years, who had not the authority of their parents; slaves who might be reclaimed by their masters; debtors, who might be prosecuted for debt. No person could be admitted by a single follower, but he was to be examined and received by the whole assembly. The legends inform us, that Sákya conferred on the assembled body of the religious the office of receiving novices, and investing them when prepared, and also, that he appointed two chiefs of the assembly.

The different classes of persons, composing the assembly, of which Sákya was the chief, were as follow. First, the mendicants; to them corresponded a body of female ascetics, the admission of whom was guided by the same regulations. They had also to submit to the same obligations, enjoined by the law of discipline, viz. to the observance of perpetual chastity; and to the duty of supporting themselves by begging. These ascetics of both sexes compose the body of the assembly; a degree lower are placed the Upasakas and Upasikas, that is to say, the devotees, or more generally, the believers, who professed to believe in the truth, revealed by Sákya, without having assumed the life of an ascetic. Mr. Burnouf believes, that this institution was not introduced until after the death of Sákya. I do not think, he says, that Sákyamuni would from the commencement of his preaching have divided his assembly in Bhikchus (mendicants) and

Upasakas, (devotees) of both sexes. The external organization of Buddhism like its metaphysics, must have rather passed through numerous degrees in consolidating itself, before it attained the state in which we find it among nations, a long time converted to Buddhism. The books of Nepal even allow us to watch the progress of this organization, which commences indeed from a small germ. Sakya has first five disciples, who soon desert him, when their master, exhausted from long fasting, has broken the vow of abstinence. The number of his disciples gradually increaces; kings, Brahmans, merchants, join them to hear the word of their master. These are the Upasakas, the assistants, at a later period the true devotees.

Still the ascetics alone formed the assembly of Sákya; it is therefore called in the texts "the assembly of the mendicants." The term San-gha implies a double relation, first of all the religious with the Buddha, and secondly, of the religious with each other. As regards the principle, the only bond, which unites them with their master and with each other, is the common submission to his word. Having received from Sákya the knowledge of the fundamental truths and the title of ascetic, they live in all other points differently, some in the solitude of woods and mountains, others in deserted houses, others in forests near villages or towns, which they leave only to procure their subsistence by begging.

Several circumstances, related in the legends and Sútras, go far to show the commencement of this organization. While Sákya lived, it was natural, that his disciples should attach themselves to his person. Not all the religious, however, lived in solitary places, and even those who had chosen this kind of life, left it sometimes to hear the Buddha. At the approach of the rainy season the ascetics could give up the vagrant life of mendicants, and were allowed to retire to fixed abodes. Then they dispersed to reside with Bráhmans or house-holders, favourably disposed towards them, and occupied themselves with explaining the truths of their belief, or with studying and meditating on the points of their doctrine, with which they were less familiar. This was called staying during the rains (Varsha). When the Varsha expired, they again met, and formed a real religious assembly. All conspires to establish the opinion, that this usage was introduced by Sákya himself or his first disciples. This is one of the circumstances, which favoured the organization of the religious as a



regular body. One of the first results was the establishment of Viháras, or monasteries, situated in forests or gardens, where the religious assembled to assist in the preaching of their master. These Viharas, however, were at first not establishments, to which the ascetics retired for their whole life; on the contrary, they first were only places for temporary sojourn, or according to etymology, places where they sojourned, and the origin of the term is expressed in the very formula, which commences every Sútra, "At a certain time Sakya sojourned (viharati sma) at such or such a place." The principal destination of the Viharas. second only to their being intended as asylums for the religious, was to receive travelling ascetics and foreigners. There undoubtedly is a great distance between this almost pastoral state of Buddhism and the flourishing condition, in which Fahian found it in the fourth century A. C. in the rich Viháras and hermitages; but between both periods nearly nine centuries are intervening. However great the difference may be between these two conditions of Buddhisre, it is evident, that the second must have soon resulted from the first. Indeed, the ascetics having obtained fixed abodes, their mutual connection must have become closer, and owing to this circumstance, their body have become better organized and therefore more compact than that of the Brahminical ascetics. With this material fact there was combined the necessity of resisting the attacks of their adversaries. This made them sensible of the expediency of forming an association, which afterwards might be easily changed into a monastic institution. The religious assembly once established, a hierarchy must have soon formed itself to maintain order. Thus we see in all legends the Bhikchus taking rank according to their age and merit. In the assembly rank depended upon age, and the principal ascetics had the name of Sthavira (in Pali Thera) elders, who occupied in the assembly the first rank after Sakya. The Sthaviras were again divided into elders and elders of the elders. Merit also distinguished the ranks, and the author even thinks, that an incontestable superioxity was only assigned to him, who combined merit with the privilege of seniority.

Aryas, venerable, were called those, who had comprehended the four sublime truths, the fundamental axioms of the Buddhist doctrine, viz. 1, there exists pain; 2, all that is born in this world, suffers pain; 3, it is necessary to liberate ourselves from it; and 4, knowledge alone offers the means of this deliverance. The title of Arya was one of the highest obtainable; beside the knowledge of those truths, it required the possession

of supernatural faculties, and was given to the first and most eminent disciples of the Buddha. They are not called so according to their seniority as the Sthaviras, but owe this title to their virtues, superior faculties, and the perfections, by which they are free from the common conditions of human existence. Other titles were Sróta apannas, Sakridá gámins, Anágámins, and Arhats. We cannot follow the author into the learned discussion, by which he endeavours to establish the meaning of those terms, but notice here only the result, that the first three appear to be derived from future states, promised to all believers by the word of the Buddha, while Arhat is a state, which a person can only obtain by superior knowledge, after having embraced religious life, and the consequence of which is the possession of the five supernatural faculties.

To sum up with the author. The assembly of Sákya, or what is the same, the body of the religious followers of his doctrine, was composed of Bhikchus, or mendicants, who also called themselves Sramanas, or ascetics, and among whom the seniors assumed the name of Sthaviras, or elders. The first two titles were so to say absolute denominations, while in relation to other members of Indian society, the religious named themselves Aryas, or honourable, and in relation to their master. Sravakas, or hearers. Among these latter were distinguished the Maha sravakas, or great hearers. By applying the denominations of Sróta Apanna, Sakrid Agámin and Anágámin to the believers, we must admit, that the advantages promised to those who were defined by these titles, were not withheld from the true followers, but these advantages, which could only be realized in a future life, did not constitute degrees of rank in the hierarchy. The only title of this kind is Arhat, or venerable, denoting an ascetic, superior to the other Bhikchus, on account of his knowledge and supernatural faculties, so that in fact, with the exception of synonymes and some minor varieties, just alluded to, there are only two classes of hearers, the Bhikchus and the Arhats.

A very remarkable institution, which belongs even to the time of Sákya, is that of confession. Firmly established in the most ancient legends, it is easily recognised as one of the fundamental institutions of the Buddhist faith. The fatal law of transmigration attaches reward to good actions and punishment to bad actions, it even establishes the compensation of the one by the other, by offering to the sinner the means of liberating himself from its effects by the practice of virtue.

This is the origin of expiation, which holds such prominent place in the Bráhminical law. This theory is passed by in Buddhism, which takes it as a fact with so many other elements of Indian society; but here it assumes a particular form, by which its practical application is considerably modified. The Buddhist believes with the Bráhman, that bad actions may be compensated by good ones; but as he does not believe any more in the moral efficacy of tortures and punishments, the expiation has returned to its principle, that is to say, to the feeling of repentance, and the only form which it receives in practice, is confession.

Among the principal duties of the ascetic were the obligation to take his meal together with those who lived in the same monastery, and the commandment, never to refuse his guest any assistance he required. The latter commandment, though based on the beautiful idea of the Orientals, as regards hospitality, had taken a peculiar application with the Buddhists. By a predilection for moral sentiments, they introduced these ideas into the religious life, which they always represent as the ideal of the life of man in this world. Hence appears the real character of Buddhism as a doctrine, where the practice of morality is the supreme law, and distinguishes it from Bráhminism, where on the one hand philosophical speculation, and on the other, mythology, occupies so conspicuous a place. Hence Buddhism also bears witness to its being posterior to Bráhminism. If moral systems are indeed subsequent to ontological theories, which is positively proved by the history of Greek philosophy, Buddhism is necessarily, and to say so genetically, posterior to Bráhminism.

The worship of Buddhism is most simple. A religion, says the author, without many dogmas has only a simple form of worship, and nothing in fact is simpler than that of the Buddhists. It is evident a priori, that Sákya attached little importance to such a form, and the Sútras give evidence, that he valued much higher the discharge of the moral duties than the practice of religious ceremonies.

The religious ceremonies consisted in offering flowers and perfumes, which was accompanied with the noise of instruments and the recital of hymns and pious prayers. There were no bloody sacrifices. The worship is in fact not addressed to One God, or to a number of divine beings, invented by the imagination of the Bráhmans; it has only two objects, the representation of the figure of Sákyamuni, and the buildings enshrining a part of his bones. An image and relics, this is the whole

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worship of the Buddhists. Hence it is easily understood, why the legends are so much occupied with the physical beauty of Sákya. The Buddhists attribute, as is generally known, to the founder of their doctrine, the possession of the 32 characteristics of beauty and 80 secondary signs. The image of Buddha is not, as those of Siva or Vishnu, an exaggerated number of attributes, but simply of a man, seated in the attitude of meditation, or making the sign of preaching. This image, with the exception of inconsiderable differences, is invariably the same.

Here must, however, be considered the modifications which Buddhism underwent in the course of time. The worship indeed has not changed much; but new objects of adoration are associated with the image of Sákya. In more ancient time these must have been the statues of the four Buddhas, previously to Sákya; in more modern times the images of the five Dhyáni Buddhas and the Bódhisattwas, known from the exact drawings of Mr. Hodgson; but on the whole, the type is the same, viz. of a man who meditates and instructs.

The second objects are the relics, which have the significant name of Sarira (body.) This application of the term is entirely foreign to the language of the Brahmans. It is the body of Sakya himself, adored in the relics. They were collected on the funeral pile, where his mortal remains were consumed, and according to the tradition, enclosed in eight cylinders of metal, over which the same number of monuments, called Chaityas, were raised. The monuments still extant in India, corroborate most satisfactorily this tradition. From Clemens of Alexandria, who speaks of the venerable sages adoring a pyramid, under which the bones of a god were entombed, to Fahian, the Chinese traveller, to General Ventura, who in our time first opened these topes, the uninterrupted tradition of seventeen centuries confirms the existence, and even the destination of these monuments.

But here we must pause, being afraid to have already trespassed upon the indulgence of the reader, and at the same time feeling unable to do justice in so short a sketch as this to the third part of the work, in which the author enters into the intricacies of the metaphysical tenets of the Buddhists, and introduces us to their various schools. We only observe, that it is full of important results, and that Mr. Burnouf by discovering in one of the MSS, the names of the Buddhist schools, as they occur in the controversial writings of the Brahmans, has supplied the link, which appeared to be lost, between the historic philosophy of the Brahmans and Buddhists.

In taking leave of the author with the hope, that he may soon be able to complete his important work, we conclude with expressing the wish, that it may contribute to revive the zeal for similar enquiries here in India. May it warn us that by collecting the Sanscrit and Pali MSS. from all parts of India, we may still open new sources to the learned, may it warn us, that there still are ancient architectural monuments, which are not sufficiently explored, and which may perhaps but for a short time longer, invite us to preserve the records which they have for centuries offered to the enquirer.

On the genuine character of the Horá Sástra, as regards the use of Greek terms. By J. Muir, Esq., C.S.

In the "Zeitschrift für die Kunde cles Morgenlandes," part 2nd, of the 4th volume, page 302, et seq. there is a translation of an article, from the translations of the Literary Society of Madras, by Mr. C. M. Whish, on the origin and age of the Indian Zodiac, with remarks by Mr. Lassen. Mr. Whish's paper is written to prove the derivation of the Hindu Zodiac from the Greek Astronomers, and in pursuance of this object, he quotes from a Sanskrit Astrological work, called the Horá Sástra, a verse in which the names of the different signs of the Zodiac are evidently of Greek origin. Mr. Lassen in his remarks on Mr. Whish's paper, subjoined to the translation, expresses a doubt of the Horá Sástra being a genuine work of the ancient Astronomer Varáha Mihira; and, (in the absence of the original works, to which he had not access,) refers to Mr. Colebrooke's account of that writer's works, in which no mention is made of the Horá Sástra.

Being anxious to ascertain the age and genuineness, or otherwise, of the Horá Sástra, according to the idea of the Astrological Pundits at Benares, I sent a copy of the Slokes quoted from that work in Mr. Whish's paper to Bapu Deo Sástri, (an enlightened young man, an eléve of the late Mr. L. Wilkinson, and now Professor of Natural Philosophy in the Government College at Benares.†) He at once recoglished.

\* Part I. London 1827, pp. 63-77.

† Bapu Deo is an excellent Astronomer and Mathematician, well read in the Hindu system; and in the European, advanced as far as the Calculus, and daily adding to his knowledge. He has written a Treatise on Algebra, on the European

system, in Sanskrit and Hindi.

nized the verses as being from the Vrihat Játaka, which is mentioned in Mr. Colebrooke's Dissertation on the Algebra of the Hindus (Essays, Vol. II. p. 478.) as the work of Varaha Mihira. He also brought me a printed copy of this work from the press of Madhab Ram, Calcutta, which I forward by Bhangy for the Society's inspection, though it is probably already in your Library. So far therefore as the authority of Mr. Colebrooke, (who fixes the date of Varaha Mihira at the close of the 5th or beginning of the 6th century of our Era) is conclusive; and so far as the occurrence of the sloke in question in the modern copy of the work is admitted as a proof of its having been there from the commencement; we have evidence for these Greek terms being known to the Hindu astrologers from the beginning of the 6th century.

For the satisfaction of the curious, I quote the sloke containing the Greek names, and subjoin the Greek originals as given by Mr. Lassen from Mr. Whish's paper. The names differ a good deal in Madhab Ram's printed copy from those given by Mr. Lassen.

## किय तावृरि जितुम कुलीर लेय पाधेय जूक कार्ण्याखाः। तौचिक आकाकरो हुद्रागश्चान्त्यं भं चेत्व॥

Sanskrit Names, as given in Madhub Ram's printed Copy.		Sanskrit Names, as given by Mr. Whish, as quoted by Lassen.	Original Greek terms, as given by Whish in Lassen.
1.	Kriya,	Kriya,	ΚΡΙΟΣ.
2.	Táburi,	Tavuru,	ΤΑΥΡΘΣ.
3.	Jituma,	Juthuma,	ΔΓΔΥΜΟΣ.
4.	Kulira,	Kulíra, *	KAPKINOΣ.
5.	Léya,	Léya	ΓΕΩΝ.
6.	Pátheya,	Parthóná,	ΠΑΡΘΕΝΟΣ.
7.	Júka,	Juka,	ΖΥΓΟΣ.
8.	Korpya,	Kórpya,	ΣΚΟΡΠΙΟΣ.
9.	Taukshika	Taukshika,	ΤΟΞΟΤΗΣ.
10.	Akókéró,	Akókéró,	ΑΙΓΟΚΕΡΩΣ.
11.	Hridróga,	Hridoga,	ΥΔΡΟΧΟΟΣ.
12.	Bham (a San-	Ithusi,	ΙΧΟΥΣ.
	skrit word ap- parently,)	Times to yet a	dente de la companie

The 4th word, Kulira (कुलोर:) however, appears to be pure Sans-krit.



In addition to the Greek words above enumerated, the following occur in the verses quoted in Mr. Whish's paper, viz.

The Sun. Heli. "HALOC. Έρμης, Mercury. Heman, Mars. A'ro. Apng, Kpovoc, Saturn. Kónó. Venus. Αφροδίτη, A'sphujit, Jupiter. Jyók, ZEUC.

For Iyok, however, Mádhab Ram's edition reads Iyau: and Bapu Deo says it should be Ijyau, making with the preceding word (according to the rules of Sandhi, or combination of letters) Vachasámpatijyau, (वसांपतिज्या), being two names for Jupiter, but both pure Sanskrit.

Mr. Colebrooke, had previously pointed out the following words which occur in Hindu astrological or arithmetical works, as being of Greek origin, viz: Hera: (Hora:) Reality (dreshkána) ( $\delta \epsilon \kappa \alpha \nu \delta c$ ;) (Liptá) ( $\lambda \epsilon \pi \tau \dot{\alpha}$ ) a minute of a degree: (Kendra) ( $\kappa \dot{\epsilon} \nu \tau \rho o \nu$ .) He also instances, ("on a hasty glance over the Indian treatises on horoscopes,") anapha, sunapha, durudhara, and kemadruma, words "designating certain configurations of the planets," as "not Sanskrit, but apparently barbarian," the affinity of which to terms in other languages had not been traced. (Essays, vol. 2, p. 529.) The words anapha, and sunapha, Mr. Lassen derives, with evident probability, from the Greek  $\dot{\alpha} \nu a \phi \dot{\eta}$ , and  $\sigma \nu \nu a \phi \dot{\eta}$ . And it should be observed that, though rejecting the testimony of the Horá Sástra, he holds that the use of Greek terms by the Hindu astrologers dates as far back, as Varáha Mihira. The Horá Sástra is, however, as has been shown above, identical with the Vxihat Jataka.

I add a list of other foreign terms, pointed out to me by the Sástri, as occurring in the Vrihat Játaka; which denote, he informs me, the different compartments of a Kundali, or square astrological figure for casting nativities. They are as follows; (τ'ihpha). द्वार्वकथ (dushchiktha). द्वान (dyúna), पण्णा Pánaphara), श्रापाकिम apóklima qu. αποκλιμα, दिवक (hibuka), जामिन (jámitra), मेथूरण (mes. húrana) qu. μεσουράνιου? विश् (veshi.)

Azimghur.

Nov. 13th, 1845.



Account of the Panjkora Valley, and of Lower and Upper Káshkár, by Rajah Khan,\* of Cabool. Translated by Major R. Leech, C.B., Late Political Agent, Candahar, at whose request it was drawn up in 1840.

Panjkora is inhabited by Maleezai Eesafzais, who are divided into two sub-divisions: One extending from the commencement of the valley of Panjkora to Ousheree, called Osai; the other is called Sihsadah. The chief is a Paindah-khel.

Grain is at all times eight times cheaper than at Cabool; fruits are plentiful, as are herds and flocks. There are several iron mines. Merchants from Peshawar frequent the country.

The following are the villages of Panjkora to the west of the river. Shagoolee darrah, Taimoor-galah darrah, Rabat-i-Mahammad khan darrah, Kavanee darrah, Malahkand valley, (darrah) of Tormang, valley of Karoo, Nahag darrah, Ousheeree darrah, Zarakhel darrah, Bor-Ousheeree darrah, Dral darrah.

To the east of the river, the valley of Harhang (shrine of Ghazee Sahab), valley of Shooh, (river of Bajour falls into the Panjkora).

Baba khels, formerly under Aslam khan, now under Ghazan khan.

Valley of Maidan, valley of Panjkora, valley of Shamoor-gurh, valleys of Thankee and Doodba enter this.

Barahwal, under Mahammad Alee khan, (an iron mine here).

Bar Panjkora, Ghundee Chakgatin, Arota Seen (river), Deer, Panakot, Kashkaree, Doobandai, Kheer, dependent on Deer.

These valleys have all streams. One river from Bajour, which is to the west of the Panjkora range, falls into the Panjkora river through the valley of Shooh. The river of Panjkora runs from north to south.

Villages of the velley of Shagoolee. Kazrah, Shahee khels, under Zardad khan; Kotkai, Shahee khels, under Hyder khan; Gadee, Paindah khels, under Sadulia khan, brother of Ghazan khan; Haraon, Shahee khels, under Masoom khan; Shagoolee, Noor khels, under Aiyoob khan.

Valley of Timoor-galahs. Timoor-galah Noor khels, under Sardar

<sup>\*</sup> This man also under my instructions visited most of the Turkistan, states and gained a quantity of information regarding the Siahposh Cafers. His notes are in my possession.



khan; Khoonkoh, Noor khels, under Mahsin and Ghafar; Mayan Mandah, Sahabzadahs, under Mahsin and Ghafar; Datooh, Akhund khels, Charpherah, Nasradeen khels, under Mahammad khan; Shahr, Nasaradeen khels, under Sarwar Myan.

Valley of Rabat. Samrai, Paindah khels, under Gul khan; Rabat, Nasradeen khels, under Muhabat khan; Kanjalah, Myan khels, under Agha Sahab.

Valley of Kavnee. Walkhah, Paindah khels, 1000 houses; Mala-khand, mixed tribes, 1000 houses.

Valley of Tormang. Akhqram, Painda khels, under Agad Rahman; Doodba, Painda khels, under Sher Alee.

Valley of Karoo. Inhabited by Taroozais and Eesafzais.

Valley of Nhag. Nhag-Painda khels, under Chiragh Shah; Wadee-Paindah khels, under Bazoo; Jaghakinj, Gadhai khels, under Allaiyar khan; Darooja-Sultan khels, under Sayad Ameer.

Valley of Oosheeree. Oosheeree Sultan khels, under Kaza Abdu Rahman; Beebeeyawarah Paindah khels, under Abdulla Khan; Kandeekan, Myan khels, under Sayad Adam, Kakazin, Myan khel; Jahar-Sultan khels, under Mahammad Hawefa; Jaharalmas Paindah khels, under Zareef khan; Tar-pitar Painda khel, under Hujoom khan.

Bar Oosheeree Valley. Oosheeree, Paindah khels, under Awar Shah khan; Barkand Myan khels, Kareemdad, descendent of Akhund Darveza; Damazar, Paindah khels, Ahmad khan; Palam, Paindah khels, Fazal Shah; Samkot, Paindah khels, Sher Zeman; Batil Myan khels, Khairulla Myan; Nashtamil, Goorkhavee, Habeebee, Paidah khels, Myan Nazeem; Kamangar Noor khels, under Hakeeb.

Valley of Dral. Dependent on, and tributary to, Ghazan khan. Valley of Hurhang. Desolate beyond the villages of the Zyarat.

Valley of Shooh. Having villages and gardens on each bank of the Bajour river.

The Baba khels were formerly under their own chief, Aslam khan. Ten years ago, Ghazan khan subdued them.

In the valley of Maidan, is Kheemah Shahee khels, under Baroon, and many other villages. The inhabitants are more formidable than those of the other valleys.

Valley of Panjkora. Bar Panjkora, Sultan khels, Sher Alee; Kooz Panjkora, Sultan khels, Pagal; Patao, Sultan khels, Mardan, Valley of Shamoor Gurh. Shamoor Gurh, Paindah khels, no chief; Geer, Paindah khels, Allaiyar khan; Amlookuar ryots, Paindah khels; Jublak ryots, Paindah khels.

Barahwal, belonging to Mahammad Alee khan, included in, but not tributary to Panjkora; an iron mine of long existence.

The following villages are marts for merchandize.

Surkhal, Loorkhal, Deer, Barahwal. The chief of this valley of Panjkora is Ghazan khan, son of Kasam khan, son of Zafar khan, son of Ghulam Khan, son of Akhund Ilyas, whose descendants are distinguished from other Paindah khels, as Akhund kor, (kor-house.)

Akhund Ilyas, was a holy man who had two sons, Aoob and Ismail, he lived in the time of Aurungzebe.

Aiyoob was a domestic in the household of the governor of Cabool, and after a long period of faithful service, got leave to return to his native country, accompanied by four tradesmen, (one goldsmith, one carpenter, one huntsman and one mason.)

Mulla Ilyas told his sons, he had only one sword, and one kajkol, (vessel in which beggars receive their alms,) to bequeath them, and told them to choose; Ismail chose the kajkol, and his descendants are religious recluses and beggars; Aiyoob chose the sword, and his descendants are rulers.

Kasem khan had three sons, Azad khan, Ghazan khan, and Sadulla khan, their mothers being Eesafzai.

In the time of Shah Mahmood, Azad khan killed his father, in return for which Sadulla khan killed his brother; Ghazan khan, with the assistance of Shah Kater got the country, to this day the same friendship exists with the Chatrar nation.

This year, in the month of Muharam, the brothers had a fight, losing between them twenty-four killed and wounded.

Herds and flocks are not taxed, but three rupees a year is taken from each house.

They are friendly to the Lahore government, and exchange presents.

Just now an elephant has been sent by the Lahore government, and in return they send iron, honey, or hill horses, through Sultan Mahammad khan.

They are continually sending to Peshawar Ceskaree slaves for the governor.

From Oosheeree further to the north they have a measure called uganee, equal in weight to three charaks of Panjkora, (five Panjkora seers, four Cabool seers). Animals, sheep, buffaloes, &c. are plentiful and cheap.

In Koonahteer they make yellow soap of oil, where they are all oil pressers. The whole Nobistan as far as Hujkoom is supplied from this.

Panjkora is in length four stages, and in breadth one stage. There are four iron mines, and three of antimony, (white, red, and black).

From Maidan valley to the west, is the road to Bajour. From Barrah-wal there is another. From Oosheeree to the east is a road to Swat; from Karoo Darrah to the east, is a road to Swat; from Timurgalah and Katgalah viâ Talesh to the south-east; is the road to Ashnaghar and Peshawar, a gun-road, the only one into Panjkora. Sultan Mahammad Khan has several times been in it.

Talash is a district of the Goosafzais included in Panjkora, but without the valley, it is very fertile, grain being often exported thence to Peshawar. There are remains of buildings like towers, in which are stones of a cubit length, on which are Greek (?) characters.

The following are the villages of Talash;—Bagh, Shaha khels, Ghulam Shah; Shamsee khan, Shaha khels, Shah Afzal khan, Gumbatee, Shaha khels, Shah Afzal khan, Amlook Darab, ryots.

Muchoo, Noor khels under Ghazan khan; Bajooroo, Noor and Shahee khels. Shah Afzal khan; Kamangar; the inhabitants are all bow-makers, whence the name.

Deer is the boundary of the snow and rain.

The river of Panjkora takes its rise at Laspoor, the commencement of the hilly country of Kashkar.

From Deer to Kashkar, viâ the Pass of Doobandai, a night is spent in the road.

Kashkar is an extensive fertile country, to the north of Panjkora, thickly inhabited by a prosperous class of people; by religion, Sunnee Mahommadans: their nation is called *Chatrar*.

There are two Kashkars, upper and lower; the lower was under Shah Kator; the upper under Malik Aman formerly; they are now dead, and have been succeeded by their sons, who rule together. They are independent, having their subjects under such subjection as to sell them like animals.

5 0

Wheat and rice are plentifully produced. The men dress in two or three choghas of the kind sold in Cabool, and the women dress in a loose garb like the women of Cashmeer.

There are two sons of Shah Kator, one named Mehtar, and the other Tajamal Shah, who is the ruler. The revenue is not fixed,  $\frac{1}{5}$  and  $\frac{1}{4}$  and  $\frac{1}{2}$  is taken in kind. They do not take ready money, but barter for Peshawar goods.

Slaves are cheaper at Kashkar than any where else, viz. 100 rupees each (a girl or a boy.) 200 or 300 are yearly exported via Dardu and Badakhshan to Turkistan.

The following are the principal towns of Lower Kashkar.

Laspoor, to the east; Daroosh to the north; Dral Pooreet, to the north; Daroosh to the south; Ashreet; Ashreet, to the north; Pooreet to the east; Daroosh; Daroosh is situated in the centre of Kashkar.

Bedlooree, to the north; Daroosh, to the south; Hujkoom; Daroosh is the capital of Shah Kator, on the east of the river of Kashkar, on a slight eminence, containing 2000 houses of stone and mud. There is a wooden bridge across the river; most of the villages are to the north, east and west.

Every one within four kos is obliged to have his case settled by the ruler.

The Kashkar language approaches to the Persian. The imports to Kashkar, are salt, which is very valuable, Peshawar cloths, and cheap chintz and pedlary. Iron from Panjkora, goor, medicines, matchlocks, swords, and copper utensils.

The exports from Kashkar are raw silk to Turkistan, known in Cabool as Karah Kashkaree; and Shalakees from two rupees to twenty rupees the piece.

The finest silk is called Poodpat, and the coarsest Narinjpood, and wool choghas from one rupee to twenty rupees, the sleeves of which are larger than the arms, and when on the sleeves are creased.

The slaves are very handsome. They use measures and not weights. They amount to 12,000 matchlockmen, (the matchlocks having a fork rest) and notwithstanding the scarcity of powder and lead, are excellent marksmen.

Ten thousand Kamoz Cafers who are situated to the north of Katar and Kampar, pay tribute to Shah Kator; they are very obedient subjects, and, unlike other Kohistanees, they do not rob.

Upper Kashkar under Malik Aman, is called Shighnan. The people are Sheeah Musulmans, who know nothing of their sect, beyond the name. They pray and fast with the Sunnees of lower Kashkar.

The horses are better than in the country of Shah Kator.

The principal places of Shighnan are Mastooj, the capital of Gouhar Aman Padshah, formerly; now under the son of Malik Aman; to the south is Daroosh; to the east Hujkoom; to the south of which is Shootee.

From Daroosh, via the Pass of Soori to Mastooj, two nights are spent on the road, infested by Cafers in the summer. The road is a gunone. Guns can go throughout the country of both Kashkars beyond Daroosh, but up to that the road is difficult for laden horses.

Shighit to the north, and Shighnan to the east, are included in Kashkar, but under a separate rule.

From Shighnan to Shighit are five stages. The Cooner river passes to the west of Mastooj, and takes its rise in the lake of Neel. Beyond Mastooj, water runs to the north.

On the Assam Petroleum Beds (in a letter to Major Jenkins, communicated by him.) By Capt. P. S. Hannay.

Mr. Piddington having supplied me with a specimen of Asphalte rock from Pyremont, I have taken some trouble in trying to find something of the kind amongst the numerous coal strata and bituminous springs which abound in the neighbourhood of this place, but as yet have not been successful in finding a calcareous Asphalte, which the specimen furnished appears to be, and this may be accounted for, probably, by the absence of anything like a pure limestone rock, existing with the carboniferous strata which is visible.

I have however the pleasure to send you a few specimens of the earthy Asphalte and indurated sandy Asphalte, found in and lying over the Petroleum beds, near a spot which I dare say you recollect as

Nahore Doong, an old Salt Well, situated about two miles from this, on the road to the Naga hilfs.

About 200 yards on the Jeypore side of this old Salt spring, the road crosses a vein of coal, of considerable thickness, accompanied by several beds of soft sandstone. This road is merely a ravine, which like many others, intersect the low hills here, in different directions, so as to give them the appearance of being distant from the more regular forms of the low range, which rise suddenly from the plain; in fact, many are quite detached, and rise in knolls of some 50 feet high, surrounded on every side by a natural ravine, in which coal, various soft rocks, shells and clays, usually associated with the former substance are seen on regular strata, and also detached pieces of fossil wood, clay iron ore, and exceedingly hard quartz rock. This kind of ground extends for about a mile E. and N. of the coal first mentioned, and I believe there are few ravines in which there is not an appearance of Petroleum, either exuding from under a mass of limestone on a level with the bed of the ravine, or at some height up the slope of the hillocks.

From this locality, or rather at two spots where, from the quantity of Petroleum visible on the surface, they are designated Tel Doong (or Oil-springs) I have taken the specimens now sent, but you must recollect that these are taken from the mere surface, and it is quite possible that a more interesting and valuable formation of the same kind might be found at some depth, particularly as regards the connection of calcareous matter, with that from which the Petroleum is thrown up. I mention this, because, from the appearance of the specimens of blue limestone found in the bed of the Dehing River, under the water (it being evident that this river cuts through the whole of the strata before-mentioned) it might be possible to find at the depth of the Dehing bed, inland, a purer limestone than that which is on the surface. However it may be as well to say, that the different strata appear to bend Eastward, and dip to the South towards the high range of Naga mountains, in the lower portions of which there are numerous salt springs, the prevailing rock there being clay slate. Nothing like mountain limestone is to be seen, as far as my travels extend, on the Assam side of these mountains: and I have an idea that without some extensive formation of this kind in contact with our carboniferous strata or bitumen eprings, we shall fail to find a calcareous Asphalte like that of Pyremont. Our coal is, I believe, considered to be that of the higher series of secondary rocks, if then we could find bitumen springs at the foot of the high range on N, B. of the Burrampooter, possibly a rock of the description would be found, but this is a question for Geologists to determine.

Jeypore is not the only Petroleum locality in Upper Assam; Borhath, Teroogong, Magawn, Namdeng and Namtchuk Pathar are noted for their earth oil springs. These are all situated in the low range of hills forming the base of that vast range of mountains which, bounding the Kymdwar valley on the West, would appear to run down to Cape Negrais. The first locality to the Westward is close to the Dekho River, south-east of Seebsagur; but it is said that amongst the Nagas on the Western branch of this river, salt wells do not exist:\* on the Eastern branch of the river, however, there are many salt wells, and near the source of this branch, in about Lat. 26° 20' the mountain range abovementioned separates from the more western Naga ranges which run towards Cachar. The great Salt, Coal, and Petroleum deposits seem therefore to commence with the east branch of the Dekho, and continued east as far as the Namtchuk river. At Namtchuk Pathar, near the mouth of the river, the Petroleum exudes from the banks, and a bed of very fine coking coal runs across the bed of the Namtchuk. The hills here are also intersected by ravines, and in one spot an extensive basin or hollow is formed at some height, which contains muddy pools in a constant state of activity, throwing out, with more or less force, white mud mixed with Petroleum. This is indeed a strange looking place, and I am told by the Singphos that at times there is an internal noise as of distant thunder, when it bursts forth suddenly, with a loud report, and then for a time subsides. Whether this may be the effect of distillation going on in conrequence of the great mass of vegetable matter which lies under the surface, or from some more remote cause connected with volcanic action, it is impossible for me to give an opinion; but from the connection of the Potkae with the Arracan range of mountains, the known existence of mud pools like these, in that

<sup>\*</sup> This is a mistake, there are salt springs on the banks of the Nambar and Dhunsiri rivers, and it is supposed there are many more, but the Nagas West of the Dekho do not make salt, except at Semkur in very, small quantities. By their traffic in cotton they obtain salt perhaps cheaper than they could make it.



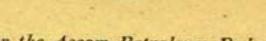
Province, and the fact, that the motions of our earthquakes are generally from south to north, I have often thought that during an active state of some of the volcanoes in the Gulf of Martaban, they might affect us here.

The Tel Doongs, or Oil-springs, and probably containing salt, are the resort of the wild animals of the forest, who eat the mud, particularly elephants, buffaloes and deer, and securely placed on a Michong, formed in one of the largest trees overlooking these pools, the Shikarrees of this frontier cilently await, in the moonlight nights, the visits of these animals, and with a poisoned arrow fired from a musquet, shoot the largest elephants, which are afterwards tracked down probably for days. If the animal has a fine pair of tusks, the price of these amply repays the trouble and privations suffered in obtaining them;—most of the ivory of the Singpho country is obtained in this manner. The springs in this neighbourhood afford good sport to the Shikarrees of the corps, and many a load of Saumer Deer flesh comes into cantonments, the result of a night's watch at, or an early morning visit to, the Tel Doongs.

No. 1 Basket, contains specimens of soft rock through which the Petroleum rises: the whole mass of substance seems to be impregnated with it; the soil however, is sometimes by itself in fissures and seams, running out as these are cut open. The Nodules are found embedded in regular veins intersecting the soft rock, and more or less oil is found mixed up with them. I have not dug deeper than ten feet into the bed.

No. 2, contains the Earthy Asphalte which is found in considerable quantity, where the Petroleum oozes out, and also adhering to the soft sandstone rock impregnated with, and laying in, the Petroleum bed.

No. 3, contains the indurated sandy Asphalte rock, which I found overlying the spot where Petroleum exudes from under the low hills, of which it is in fact a portion, more ordess of the red clayey soil being also impregnated with the bitumen; and the distinguishing feature of the soil of the hills in the Petroleum vicinity, is a peculiar dryness, however wet the weather may be. The soil bears a thick tree jungle, principally of a species of oak; the acorn-fruited Hingooree of these parts. None of the specimens shew the presence of lime, but a hard rock, which effervesces slightly with acid, does not slake when burnt, and flies into splinters when heated, passes through the Petroleum bed; specimens of this limestone I sent to you some years ago, calcined and



pounded. It would, I think, make a cement similar to Parker's, or the Roman cement.

No. 4, contains specimens of a conglomerate containing lime, forming a conspicuous rock a mile from this, directly on the edge of the river on both sides. In connection with this, indeed in some places adhering to its lower surface, as well as in the bed of the river itself at the same place, is the blue rock containing lime; from the quantity of pure carbonate of lime adhering to the surface of one of the pieces, we might reasonably suppose that a rock even purer than the specimens now sent, does exist in the same place; but the depth of the water will, I am afraid, effectually prevent its being worked; what is found of this blue rock however, when burnt carefully, slakes into a very good buff coloured lime, quite fit for building purposes. The conglomerate when burnt, partially slakes, and, when pounded up, forms a very strong cement, well adapted for flooring or roofs, or lining of water tanks, &c. Accompanying these specimens, I have sent a sample of a mixture of Asphalte earth, and pounded unburnt conglomerate fused with a small quantity of the mikai tree rosin, also a few pieces of the clay and ore of the soil of the hills of the Petroleum locality: there appears to be too much earth in it; as another trial I have made by covering the top of my boat, has succeeded very well, I do not see why we could not use the earthy Asphalte with success, in covering matting or plank roofs of boats or houses; it deserves a trial certainly.

Remarks upon the occurrence of Granite in the bed of the Narbudda.

By Capt. J. Abbott, B. A. Late Principal Assistant Commissioner,

Nimarr.

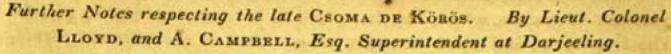
In a report upon the Mhahlie Cotton of Nimarr, which I prepared about two years ago, and which, I believe, reached the Asiatic Society, I stated, that the trap stratum of Malwa was not penetrated to its base, even by the river Narbudda, which has mined its bed 1600 feet below the table summit of the Vindhecias.

Some weeks after the despatch of this report, I visited an island of the Narbudda, opposite Mundlaisir, in order to inspect a block of grey granite, which I supposed had been accidentally deposited there.

I found, however, that this mass was in reality the pinnacle of a substratum of granite, which had there, and in several other places, pierced the trap rock; and upon attentive examination of the adjacent strata, there appeared a transition from the close, compact and uniform texture of the black trap to the granulated crystals of the granite. That is, the trap gradually assumed a less homogeneous character, separated into particles slightly blended together, and then into the distinct crystals, characteristic of granite; one stratum being the common grey kind, another the red, and a third the porphyritic, all forming with the horizon angles exceeding, I think, 75°. It was my intention to have selected and sent specimens of each transition; but heavy duties, and my subsequent removal from the spot prevented me. Should the Society be curious to see such, I can write to Col. Outram, my successor at Mundlaisir, and beg him to forward specimens.

The fact seems to me of some interest, if only as exhibiting the thickness of the trap and amygdaloidal strata of Malwa, which may thus be plausibly calculated at 1600 feet. The whole scarp of the Vindhecia, forming the Southern limit of the province of Malwa, exhibits an abruptness which savors of disruption of surface, by the elevation of the table land, or the sudden subsidence of the valley of Nimarr. Yet I have never heard of granite occurring in any portion of the section of strata presented by these precipices. A stricter examination of the strata is perhaps requisite to throw light upon the subject.

If in all cases of the appearance of granite immediately beneath trap, the two formations blend their distinctive characters on contact, it might, with some shew of reason, be assumed, that both have been in a state of fusion at one and the same time; and the more complete crystallization of the granite might be referred to the greater pressure under which it parted with its caloric.



[The following letters have been kept back from publication owing to circumstances, which need not special detail. I should observe with reference to Lieut. Colonel Lloyd's remark as to the absence of any notice of the deceased scholar's literary labours in the Journal, that No. 124, contains a notice of his personal and literary habits, embodied in a Report as to his death, from Mr. Campbell, with remarks appended by myself. I mention this for the facility of reference.]

With reference to the resolution of the Asiatic Society to place 1000 at my disposal, for the erection of a monument over the grave he late Mr. Csoma de Körös, I have the honor to state, that in ideration of the necessary delay and difficulty in procuring a suitnarble monument from Calcutta, I have had a plain pillar of submasonry erected to mark the spot, and I purpose placing a tablet of stone in the pillar, with the date of his death, his name, and age only, inscribed thereon. This, however, is not wholly the manner in which I wish to see the Society's intentions fulfilled; I am anxious that a marble monument, with a suitable inscription to commemorate the deceased, shall be placed in the Church at Darjeeling, and to enable me to do so for the Society, if the proposal is approved, I request to be furnished with the inscription which the Society may consider the most appropriate.

Since the death of de Körös, I have not ceased to hope, that some member of the Society would furnish a connected account of his career in the East. It is now more than a year and a half since we lost him, yet we are without any such record in the Journal of the Society to shew, that his labours were valuable to the literary association he so earnestly studied to assist in its most important objects, as well as to shew that his labours have been duly appreciated. I know that I am not qualified by knowledge of the language and literature of Thibet, to do justice to the subject, and I have not on that account attempted it; but in the belief that the Society will be better pleased to have an incomplete notice of his labours, than be altogether without one, I have compiled a note of his published contributions to the Asiatic Society on the language and literature of Thibet, which is hereunto annexed. I have also the pleasure to forward a copy of a Biographical sketch of the

deceased by himself, which appeared in the Journal of the Royal Asiatic Society many years ago, and which was corrected by the subject of it before his death. The number of the Journal containing the sketch, with the author's manuscript corrections, is now in my possession, and was, with the Journal of the Asiatic Society of Bengal, made over to me, according to the intentions of the deceased, as expressed previous to his illness.

Further, I have the pleasure to forward copy of a summary report of the contents of the Thibetan works in the possession of the deceased A. D. 1825, which I cannot find has been published. It was forwar, to to me by Lieutenant Robinson of Sirsa, in the belief, that as the ves, of de Körös it would be acceptable to me. If it has not hitherto the published, it will be an interesting addition to the contributions ocesauthor.\* At the time it was written, the European world was altogether ignorant of the subject on which it treats; and the g the himself had then but a faint glimmering of the light he afterward may To admire the zeal, and laborious perseverance, by wi he advanced in the ability to interpret the works he then so briefly reported on, and to compare the later elucidations of Thibetan works by the same pen with this his first essay in that line, will be a gratifying task to the admirers of his attainments, and an useful incentive to those who, in the commencement of a laborious study, may doubt their powers of advancing in it to renown and eminence.

From the date of the Biographical sketch (1825) until his death on the 11th of April, 1842, the particulars of the life of Csoma de Körös, are not fully known to me. I believe that he visited Western Thibet from Soobathoo in A. D. 1826, and that he continued to study at the monasteries in that country, living in the poorest possible manner until A. D. 1831, in October, of which year, I met him at Captain Kennedy's house, at Simla. He was then dressed exactly as when I saw him on his arrival at Darjeeling, in March 1842, in a coarse blue cloth loose gown extending to his heels, and a small cloth cap of the same materials, he wore a grizzly beard, shunned the society of Europeans, and passed his whole time in study.

In May 1832, he went to Calcutta, where he lived in the Asiatic Society's Rooms, and had charge of the library until the beginning of

<sup>\*</sup> Forwarded to the Asiatic Society, in December, 1843.

1836, when his anxiety to visit Lassa, induced him to leave Calcutta for Titalya, in the hope of accomplishing his design, through Bootan, Sikim, or Nipal. Colonel Lloyd, at that time on the Sikim Frontier, has furnished me with the following particulars of the deceased, while at Titalya, and its neighbourhood.

Csoma de Körös, or more correctly, Alexander Csoma (as well as I recollect, without reference to papers which are sent away) came up to me in the beginning of 1826, say January, but it can be easily accertained, en he quitted the apartments he had in the Asiatic Society's house. wished to study Bengalee, and I sent him to Julpiegoree, where he ained about three months, and being dissatisfied there, returned to lya, I think in March; he would not remain in my house, as he tht his eating and living with me would cause him to be deprived familiarity and society of the natives, with whom it was his wish colloquially intimate, and, I therefore got him a common native ad made as comfortable as I could for him, but still he seemed to me to be miserably off; I also got him a servant, to whom he paid three or four rupees a month, and his living did not cost him more than four more. He did not quit Titalya, I think, till the end of 1837, November, and all the time he was there was absorbed in the study of Sanscrit, Maharatta, and the Bengally languages. I think it was in November that he left, purposing to go to Calcutta first, but ultimately he seemed to intend getting into the Ducan; at one time he was intending to travel through the mountains to Cathmandoo, and I am not certain whether he did not apply to Mr. Hodgson for a pass, but he seemed to have a great dread of trusting himself into Thibet, for, I repeatedly urged him to try to reach H'Lassa through Sikim, and he always said such an attempt could only be made at the risk of his life. I am therefore surprised at his after all coming here apparently with that intention, yet he seemed anxious to go to two monasteries in particular, where he said there were large libraries, and one where one or both the large works, the Kagzur and Sangzur, are, he said, printed. I suppose you to be writing something regarding him, therefore I send you the foregoing, which is all I can recollect just now, though could I refer to my papers, I might have Yours truly,

been able to say more. 12th December, 1843.

(Signed) G. W. A. LLOYD.

CENTRAL LISOMY

I recollect, that Mr. Hodgson had some correspondence with Csoma de Körös during the stay of the latter at Titalya, the subject of which was the possibility of his getting into Thibet, through Nipal; so far as my memory serves me, Mr. Hodgson invited him to come to Cathmandu, but did not give him any hope of being able to penetrate into Thibet, from that city. At that time the deceased was employed in the study of Sanscrit, which he continued with unabated perseverance until his death. When here he told me, that he had lost much valuable time from not having studied the Sanscrit previous to the Thibet to language, the former he said was the key to the whole literat es, of Thibet. It was on his then knowledge of Sanscrit, that he by the enthusiastic hopes of realising the objects of his research. Could cesreach Lassa, he felt that the Sanscrit would have quickly enable to master the contents of its libraries, and in them he believed 'g the be found all that was wanting to give him the real history h may Huns, in their original condition and migrations, and to him the the completion of knowledge, as it was the star that led him on his untiring way of thought and study for 24 years.

In 1838, M. Csoma de Körös was asked by Captain Pemberton to accompany him on his mission to Bootan, but as this did not give him any prospect of reaching Thibet, he declined the invitation, and remained in Calcutta until the beginning of 1842, when he left it for Darjeeling. The power of acquiring languages was the extraordinary talent of M. Csoma de Körös. He had studied the following ancient and modern tongues, and was a proficient in many of them,—Hebrew, Arabic, Sanscrit, Pushtoo, Greek, Latin, Slavonic, German, English, Turkish, Persian, French, Russian, Thibetan, with the addition of Hindoostani, Mahratta, and Bengali. His library at his death had a dictionary of each of the languages he was acquainted with, and on all were his manuscript annotations.

Darjeeling, December 12th, 1843.

(Signed) A. CAMPBELL.

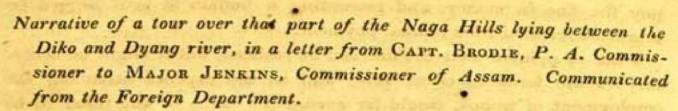
Catalogue of contributions to the Asiatic Society of Bengal on the language, literature, &c., of Thibet, by the late Mr. Alexander Csoma de Körös.

Geographical notice of Thibet, published in vol. 1, of the Journal
of the Asiatic Society of Bengal, No. 4, 1832, Page 122.

### 1845.] Further Notes respecting the late Csoma de Körös.

- Translation of a Thibetan Fragment, with remarks by H. H. Wilson, vol. 1, Journal of the Asiatic Society of Bengal, No. 7, July 1832, p. 269.
- Note on the Kala Chakea, and Adi-Buddha Systems, vol. 2, Journal Asiatic Society of Bengal, No. 14, February 1833, p. 57.
- 4. Translation of a Thibetan Passport, dated A. D. 1688, vol. 2, Journal Asiatic Society of Bengal, p. 201.
- Original of the Shakya Race, translated from the (La) or the 26th volume of the MDo class in the Ka-gyur, commencing on the 161st leaf, vol. 2, Journal Asiatic Society of Bengal, p. 385.
- 6. Mode of expressing Numerals in the Thibetan language, vol. 3, Journal Asiatic Society, p. 6.
- Extracts from Thibetan works, translated by M. Alex. Csoma de Körös, vol. 3, Journal Asiatic Society of Bengal, p. 57.
- 8. Grammar and Dictionary of the Thibetan language in two vols.

  printed at the expense of the British India Government under
  the direction of the Asiatic Society of Bengal, aided by the
  immediate Superintendence of the author, Baptist Mission Press,
  Calcutta 1834.
- Interpretation of the Thibetan inscription on a Bholau Bunner taken in Assam, vol. 5, Journal Asiatic Society of Bengal, p. 264.
- Translation of the Motto on the margin of one of the white satin scarfs of the Thibetan Priests, vol. 5, Journal Asiatic Society of Bengal, p. 383.
- Notices on the different systems of Buddhism, extracted from the Thibetan Authorities, vol. 7, Journal Asiatic Society of Bengal, p. 142.
- 12. Enumeration of Historical and Grammatical works to be met with in Thibet, vol. 7, Journal Asiatic Society of Bengal, p. 147.



I left Sibsagur on the 26th of January, accompanied by Mr. J. Bedford, Sub-Assistant, and Mr. J. W. Masters, late Superintendent of the Assam Company, with an escort of the strength noted in the margin,

1 Subadar. furnished by the Officer Commanding the Assam
1 Jemadar,
4 Havildars,
4 Naicks,
1 Bugler,
60 Sepoys. furnished by the Officer Commanding the Assam
Light Infantry Battalion. We encamped at Mittenswa, a small village near the foot of the hills the
same evening.

Leaving Mittenswa about 9 o'clock the next morning, we reached our encampment under the village of Namsang at 3 p. m.; the road is tolerably good, and the ascent easy, till towards the latter end of the march. Two long steep ascents, called by the Nagas Horoo Lejoo and Bar Lejoo, are then met with; on the top of the latter we encamped the village of Namsang being about quarter of a mile off, and from 3 400 feet above us.

On the 28th, the Seema Rajah came in with about 400 followers; at the interview I had with him, he requested permission for his dependents to come down to the plains to trade. This was arranged, the Jattoong Chiefs consenting to their coming through the Matnug Marnug, one of their passes.

Seema lies between Jaktoong and Mooloong, and has fourteen villages tributary to it. The names given of them as are follows: Lenga, Seeyong, Taya, Juitaks, Burgaon, Chinkam, Singpho Jangha, Singlung, Lungwa, Sunjee, Haching, Kamling, Tingko. The Chief stated that he had no feud at present, and readily entered into engagements to abstain from warfare.

On the departure of the Seema Chiefs, I had an interview with those See my letter No.

7. of the 9th April these named Hoang Gohein, a fine had been imposed in consequence of a murder that had been committed in the plains by one of his sons. The Chief apologized for not having come down the preceding year, which he said was caused by the small pox raging violently in his village; he alleged his inability to



pay the fine in money, and presenting a buffalo in lieu, begged he might be released from annual payment.

I am of opinion that the fine can be realized, but it might be necessary to use force to effect this; and as the expence attending the employment of troops, would far exceed the value of any thing to be realized, Government may deem it advisable to remit further payment. Before the time this fine was imposed, there had been frequent incursions on the plains by the Nagas in this direction, but for the last three years nothing of the kind has occurred; and though no absolute confidence can be placed on such vile people as the Nagas, I have very great hopes that they will keep from disturbing the peace on the plains.

There are three modes of dealing with the fine. 1st—To realize it; using force, if necessary. 2d—To let it remain in force, realizing it if possible without force—and, 3rdly, to remit it altogether; and I should wish to be favored with the views of Government as to which of these courses should be followed. Should Government be pleased to remit the fine, it might be done on the ground of subsequent good behaviour, and the ready compliance with the request made for a passage for the Seema Nagas.

On the morning of the 29th we proceeded to Naugta; there had been rain in the night, and the road was very slippery in consequence; it passes through the village of Namsang, and from thence by a rapid and steep descent to the Diko. After winding up the left bank of this river for a short distance, we entered a narrow, stony nullah, called Hoodace Jan. up which we went for about a mile and a half, and then had a very fatiguing ascent all the way to Nangta. This, for a Naga village, is a very small one, and is one of the few met with, that have no defences. The Tangsa and other tribes are reported to have destroyed it many years ago, since which the bulk of the former inhabitants have settled in other villages; those who remain appear to have thrown themselves entirely on the mercy of their more powerful neighbours, and they apparently enjoy a security for life and property beyond that of any other tribe.

Before leaving Namsang, I had an interview with the Tubloong Rajah, who had arrived late on the preceding evening. On reference to my letter No. 7, of the 9th of April 1842, para. 5th, you will observe, that I met this Chief on my former tour. Our communication on the

present occasion was much the same as before; he is extremely anxious to get possession of the land and beels he formerly held: the land is now I believe either out of cultivation or in the occupation of other parties, and the Berhampooter has carried away one of the beels, and the others have been filled up. It is not easy therefore to restore exactly what he asks for, but an equivalent might be given him in a grant of 30 or 40 poorahs of land rent free, in the Government Jykhumdang Khat, and of one or other of the beels lying between the Diko and the Desang, near where his own beels were situated. The circumstances under which the Chief lost his possessions in the plains, as detailed in the paragraph to which I have alluded, though giving him no right to compensation from the British Government, are such as call for a liberal consideration of his claim, and I would recommend its being complied with, as the most likely means of securing the attachment of a Chief whose influence is very considerable among the tribes in this direction, and who we expect to become estranged if it be refused : should it be deemed expedient to make the grant, its continuance after the present Chief's death might be subject to review whenever that event takes place.

On the 30th we marched to Kam Sing, a large and well stockaded village, commanding a fine view of the surrounding country; the Chief is one of the best disposed we met with, and we received from him here, and afterwards, as much assistance as he could give us. The journey occupied us about three hours, the road being for the most part tolerably level, with a few gentle slopes.

On the 31st we halted, to enable me to adjust, as far as I could, some feuds that were here brought to notice. The Kam Sing Chief has a feud with the Yungya Abors; but though I made every effort to get the Chiefs of this tribe brought in, I was unsuccessful: they are however on good terms with the Tubloong Chief, and I am not without hopes that I shall be able to get them to come down to the plains through his influence. He sent his nephew over, who brought in a few Yungya pynes, but they came invested with no authority from the community, and could give no account of the feuds of their clans.

The Tangsa Abors were brought over by the Kam Sing Chief; these Abors have been at war with the Namsang Nagas. The origin of the feud was represented by both parties as follows: Some years ago, a

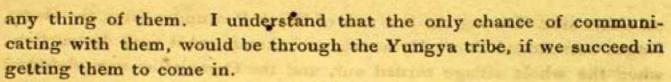
runaway Naga from Tangsa went to live in Namsang, and after having been kindly treated there for some time, he was turned out as a thief, and went back to his own village; some articles which it was alleged he had stolen, were demanded by the Namsang Chief, and on the Tangsa Chief refusing to deliver them up, his village was attacked by the Namsang Chief, who was beaten back, losing one of his followers. The dispute was adjusted by the Tangsa Chief delivering to the Chief of Namsang, a war dress, sword, shield and spear.

The Namsang Nagas had also a quarrel with the Nagas of Nowgong. It arose in a claim for tribute alleged to be due from Nowgong to Namsang; the two tribes had long been at war, and numbers have been cut up on either side. On one occasion when the Nowgong Nagas had suffered severely, they made some presents to the Namsang Chief, which it was alleged by the former were given to put an end to the feud at that particular time. The other party maintained, that it was a tribute to be paid annually. The Namsang Chief now waived his claim on the Nowgong Chief, swearing publicly on a sword, that he had never promised to make an annual payment.

These arrangements were made on the morning of the 1st February, after which we proceeded to Nowgong. The road was very similar to what we passed over in our last march, and the distance travelled much the same. Nowgong is strongly stockaded, and set with panjees; it, like Kam Sing, commands a fine view of the surrounding country; the population is large, and the houses compactly situated; and judging from the clothing of the people, the ornaments of the women and children, their pigs, poultry and cattle, it may be looked upon as one of the richest villages in the hills; water is scarce here, and was so at our two last halting places.

On the 2nd we marched to Larayun, a village about as large as Nowgong, with the same kind of defences. The march occupied about four hours; the road is not so level as in the two last marches, but it is tolerably good; it has an easy descent to about midway, and then rises gradually to Larayun.

Larayun is at war with the Chinko or Peugaho Abors, who live on the opposite side of the Diko; I was anxious to adjust this, but could get no communication made to the latter tribe. They are said to hold no intercourse with any of our Boree Nagas, and none of our Kotokees know



On the 3rd and 4th we were halted, to get up supplies from the plains. On the the 4th we went out to Santung, a very large and populous village, about two miles from our encampment, in a south-westerly direction; both Santung and Larayun are on the ridge which separates the Diko from the Jazee; and from the former there is a magnificent view of the gorge of the Diko, which here flows down directly from the southward. While at Larayun, I received its Chiefs, and the Chiefs of Santoong and Akocca, who entered into the usual engagements; there was abundance of water from a rivulet on the Santung road.

On the 5th we had a very long and fatiguing march to the Jazee; for the first one and a half mile, we retraced our steps on the Now-gong road, and then turned westerly, descending rapidly by a narrow, steep, slippery path, which brought us to a rocky nullah, called the Seemuk; we followed the bed of this, till its junction with the Jazee, where we encamped. This march occupied us nearly nine hours.

On the 6th we proceeded down the bed of the Jazee for some little distance, crossing and re-crossing it several times. After leaving the river, we ascended by a very narrow path, with high reed jungle on both sides. As we approached Diko Hymoong, the road became wider, and it was very good in the immediate neighbourhood of the village. We had intended to encamp here, but there was a difficulty in finding a sufficiency of water, and we proceeded on towards Boora Hymoong. The road between the two Hymoongs is tolerably level and open. Huts were ready for us under Boora Hymoong, at about half a mile north of the village; the water we were able to get here, was very scanty, and had to be brought from a considerable distance.

Both the Hymoongs stand on precipitous hills, and are well stockaded. Boora Hymoong has a feud with the Ooma Nagas, an Abor tribe, with whom I was unable to communicate, or to ascertain accurately in what direction they lie. The cause of the feud, as represented by the Chief of Boora Hymoong, is as follows: the Loongtaee and Campoongya Nagas, were formerly at war; the Ooma Nagas joined the former tribe, and came to Boora Hymoong to make an attack on Campoongya; they quarrelled in drink; and numbers were then, and afterwards, cut up

on either side. During the late rule of Rajah Poorunder Sing, the Ooma Nagas surrounded Boora Hymoong, and threatened it with destruction, when the whole village turned out, and the Ooma tribe were defeated with great slaughter, though they are said to have had far superior numbers.

Diko Hymoong has a feud with the Karee Nagas, but it does not appear that there has been any recent fighting. I endeavoured, but without success, to perstade the Chiefs to go on with me to the next Dwar, where I expected to meet the Karee Chiefs. They agreed, however, to abstain from war, as did also the Karee Chiefs, when I met them a few days afterwards at Kolabaria.

At Boora Hymoong, I met the Oormoong Chiefs; they informed me that they had no feuds, and willingly entered into the engagements required of them. We heard here too, that the Sorsoo Chiefs had been at Nowgong in the expectation of meeting me there; they are said to be a numerous tribe, who cultivate cotton largely. Cotton is cultivated to some extent by all the Nagas in this direction, and to the westward, but we saw scarcely any traces of it in the route we went.

On the 9th we marched to Asringiya; we first descended for about an hour by a narrow, precipitous path, to a stream called the Teeroo, which falls into the Jazee; after crossing this, we began to ascend, and another hour and a half brought us to Laso, and in as much more, we reached Asringiya; the road between the two latter villages is good, and tolerably level. They and Campoongiya, are nearer to the plains than any Naga village we met with.

At Asringiya, besides the Chiefs of that village, we met those of Laso, Booragoon, Campoongiya and Moon Sing, who all entered into the engagements required of them.

On the 10th we moved to Kolabaria, which we reached in about 2½ hours, having passed through the village of Nowgong, about midway. For the most part the road is good, with no very steep ascents or descents; in some places it is narrow, with heavy reed jungle overhanging it. On our arrival we were told that there was no good water to be had, but after searching for about an hour, we found a very nice stream, and encamped on it in some ground that had been cleared for cultivation.



After meeting the Kolabaria and Karee Chiefs, and taking agreements from them, we moved on the 11th to Samsa, reaching it in about 3 hours: this is a considerable village, standing on the ridge which separates the Jazee and the Deesaee. Passing through the village, we descended rapidly, and in about an hour reached the huts that had been erected for us on the Sohopanee, a pretty large stream, flowing into the Deesaee. The road from Kolabaria to Samsa is easy.

We remained encamped on the Sohopance for the three following days, during which, I met the Chiefs of Nowgong, Loomtrya, Samsa, Bor Doobiya, Jafoo, Moonjee, and Aliepa. The Nagas come down here in very large numbers, and I was somewhat fearful of an outbreak; for a great many of the Chiefs were in a state of intoxication, and appeared to have very little control over their followers. We saw a marked difference in this respect here, and as we went on westward; hitherto we had found the Chiefs sober, and their orders readily obeyed; but henceforward we were to meet with nothing but drunken rabbles. In each village there are dozens of aspirants for power, and we had daily to witness brawls between them that threatened to be serious, and perhaps lead to collision with us; by great forbearance, however, on the part of my escort, things went on as well as could be hoped for, and we completed our tour without any untoward occurrence.

It may be right to mention here, an unfortunate circumstance that happened last year at Taratolla, in the plains. Some Nagas of Samsa had been down to trade, rather late in the season, and on their return, had to cross a small stream which had been dammed up, and at which about thirty or forty persons of the Non Cacharee Khel, were fishing: on the Nagas driving a bullock over the dam, a squabble ensued, and a poor Naga was killed. At the time this occurred, a rumour reached me that something of the kind had happened, and very particular enquiry was made into the matter. The reports of the Police, sent out to investigate it, and of the Mouzadars, led to the supposition that the man had died a natural death; and as the Nagas would not then come down, I was obliged to put the case by till the cold season: even when I was close to the Samsa village, I could get no one who was with the deceased to appear before me, but subsequently they came down, and I have no reason to think, that their statement, as given

above, is otherwise than true; every exertion has been made by myself and my assistants to find out the individuals concerned, and a reward has been offered, under your authority. These Cacharees, however, are the most obstinate people possible, and it is but too probable, the guilty parties will not be discovered. Should it be found impossible to bring any of the parties to justice, I would ask permission to make some suitable present to the family of the deceased, to the extent of Rs. 100 or 150, when communicating to them the result of the enquiry. The matter is still under investigation.

On the 14th February we moved in the direction of Mikilaee. We started at 7-30 A. M. and kept winding down the Sohopanee till 2 P. M. when we again encamped on that stream. About an hour after leaving our former encampment, we came upon a small piece of rice cultivation, called Baka Pathar. I was informed that many Assamese ryots took refuge here, to avoid the exactions and oppressions they were subject to, in the late rule of Rajah Poorunder Sing; a few still remain, but they complain of the incessant demands made on them by the Nagas, and it seems probable that in a short time they will return to the plains.

On the 15th we continued our course along the Sohopanee, crossing and re-crossing it continually. After leaving it, we came upon frequent swamps, over which some frail bridges were thrown. On losing the swamps, we began to rise rapidly, and in about an hour reached the Mikilaee. The whole distance occupied about four hours; we passed on, and reached Mohom in little more than half an hour; immediately under it we found an excellent spot to encamp upon, with good clear water on every side.

Mikilace is a very large and strongly stockaded village, and being See para. 49th. high and openly situated, it commands a good view of the country round about. This village has a feud with the Soomtiya Nagas, which will be presently alluded to.

We were obliged to halt for two days at Mohom to get up supplies. While here, I had interviews with the Chiefs of Mikilaee, Akook and Mohom, and after the usual interchange of presents, they gave in their engagements. Mohom is a small village, with no defences.

On the 18th we started at 7-30 A. M. for Lakotee, which we reached at 10 A. M. At 8-15 we reached Akook, a long straggling village, and passed out of it at 8-35. The road is pretty good, for the most part

level. About a mile beyond Akook, it is narrow for some distance, with thick reed jungle on both sides; after getting out this, it began to improve, and as we neared Lakotee, it became wide and open.

Lakotee is a very extensive village, with good wide roads about it in every direction. Its height, taken by a mountain thermometer, was found to be nearly 4,000 feet, the greatest height reached in our tour. We remained here for two days, during which I met the Chiefs of Lakotee, Jangpang, Burgaon, Malusee, Lougjang, and Koreegaon.

We left our camp on the morning of the 20th at 7-15, and reached the end of Lakotee at 8, Koreegaon at 10, Saneegaon at 11, and our encamping ground under Misangaon at noon. With the exception of one narrow precipitous path, about a mile from Koreegaon, the road between it and Lakotee is good; it is wide and good from Koreegaon to Saneegaon, which are both villages of considerable size. After leaving Saneegaon, the road continues good for some distance, it then goes down a steep narrow path, and rises gradually to Misangaon. The latter part of the road had been cleared, or it would have been very bad-

Saneegaon is stockaded, but not very strongly, and there are no ditches; it is the first stockade we met with after leaving Mikilaee, and this is said to have been put up in consequence of a misunderstanding with Lakotee, which has been adjusted. We met with no other stockades to the westward, except one recently made at Nowgong, in consequence of an incursion said to have been made on them by some of the Abor tribes, who live between the Bagtee and Dyang, and which will be noticed hereafter.

Our march on the 21st was very long and fatiguing, and leaving our camp at 8 A. M. we proceeded down a steep, rugged descent, and at 9-20, reached the Bagtee, a fine stream which falls into the Dyang. Shortly after leaving the Bagtee we came upon one of its feeders, called Kinnedea, and waded up its bed till 11-30. We then passed over some narrow, steep, slippery ridges, till 1 P. M. when we crossed a stream, called the Sufedee, and after ascending for an hour reached Bhedaree; passing through this village, we again descended to the Sufedee, and encamped on it, between Bhedaree and Kaboong. A portion of the coolies did not get up till next morning, and this, and bad weather, obliged us to halt on the 22d, on which day I received visits from the Chiefs of Bhedaree, Kaboong, Durria and Tilleegaon.

On the 23d we started at 6-45, A. M. and passing through Kaboong at 8-15, and Durria at 9-35, reached at 10-40, our halting place, on a stream called Durria Panee, between Durria and Rangagaon. The road throughout this march was bad, and had been made worse by wet weather; it rose to Kaboong by the side of a precipitous hill, with scarcely room for the footing of a single person. From Kaboong to Durria it is pretty level, but narrow, and through dense reed jungle. The descent to the Durria Panee, is by a precipitous path of the same description.

On the 24th we moved about 7½ A. M. and passing through Rangagaon and Kergaon, and between Sunkah and Teelagaon, encamped about 3 P. M. on a small stream under Sonaee, at a distance from it of about half a mile; this march was a fatiguing one, from the slippery and muddy state of the road, which would have been tolerably good had not rain fallen. The ascent to Rangagaon is steep; between it and Kergaon, the road is level, it then descends gradually to a stream which is crossed three times at short intervals. On leaving this, there is a fine wide road up an easy ascent to Sunkah, and from thence the road lay over undulating hills, to our encampment.

We were halted on the 25th, and I received visits from the Chiefs of Rangagaon, Kergaon, Seeka, Khoragaon, Talagaon, Sonareegaon, and Teelagaon. I also took the opportunity of going up to Sonareegaon and Teelagaon, the two largest of the Lotah villages. They probably contain about 4,000 inhabitants each. The other Lotah villages are comparatively small.

The Chief of Nowgong brought to my notice the aggression I have alluded to in para. 36th. There is no doubt that an incursion had been lately made, in which one of the Nowgong Nagas was killed, and another wounded; but it is doubtful what tribes were concerned in it. The Chief of Nowgong accused the Nang Chang and Pengsa Abors, but admitted that it could scarcely have happened without the connivance of the Sonaree and other Lotah Chiefs. A reference to the map which Mr. Bedford has prepared, will shew that if these Chiefs had been so inclined, the attacking party would in all probability have been cut up on their retreat. Nowgong is visible from Sonaree, and also from Teelagaon, and as these villages would be instantly aware of the attack, and could immediately communicate with Teelagaon and Sunkah, had they turned out



in force, it is nearly certain that the party would have been intercepted. The Sonaree Chiefs denied all knowledge of the matter; but I may mention that they were generally in a state of intoxication, and that it was not easy therefore to deal with them. Conformably with the views expressed by His Honor the President in Council, in para. 4th, of Mr. Assistant Secretary P. Melville's letter, No. 36, of the 1st February last year, I requested the Chiefs to give me their aid in obtaining an interview with the Abor tribes, which they promised to do, but it has not been accomplished as yet.

An occurrence, however, that has lately taken place in this direction, which is reported in a letter from Mr. Wood, the Sub-Assistant, stationed at Golaghat, No. 64 of the 4th ultimo, copy of which is annexed, will render a further communication with these Chiefs necessary in the ensuing cold season. It appears that six elephant hunters, while out hunting under the hills, were attacked by about thirty Nagas, who plundered whatever they could lay hold of, and wounded some of the hunters. Two of these escaped with their lives, and some are missing, and supposed to have been murdered. When applied to by Mr. Wood, the Lotah Chiefs objected to coming down to the plains in consequence of the lateness of the season, and I consider this objection reasonable enough. It is probable that they will come down when the rains are over, and give the explanation required of them, and until they refuse this, it seems unnecessary to take any measures of coercion. It is doubtful in my mind what tribe are the offenders, but from some of the depositions taken by Mr. Wood, and from the nature of the case, as detailed by him, I am inclined to think, that the affrays may have arisen from the Nagas supposing that they alone have the privilege of hunting wild elephants in the place where it occurred. It happened within the jurisdiction of the principal assistant at Nowgong, and I should wish to be furnished with instructions, as to whether the enquiry shall be made by him or by myself.

On the 26th we moved down to the plains; passing close under Sonareegaon, we turned off to the right to Nowgong, and reached it in about two hours, another hour brought us to the Dyang. The first part of the road between Sonareegaon and Nowgong is wide and open; in a short time, however, we entered narrow and difficult passes cut through the hill; these led to a small stream, up the bed of which



we passed for about half a mile, and then got into a narrow path through high reed jungle, which continued till we reached Nowgong; after leaving this, we descended rapidly, till we came near to the level of the plains, and then passed through very heavy reed jungle, till we came out on the Dyung. After proceeding down thus for about two hours, we encamped on one of its sands.

On the 27th we continued our route, following the course of the Dyung. After a very long march, we encamped a little above Nogora, and reached Golaghat next day about 2 P. M. The country under the hills is a wild, dreary, swampy forest, and continued so till we came out at Nogora. There was nothing like a road or even a beaten path, which is accounted for, by the Lotah Nagas generally using boats.

In my report of the 15th September 1841, I have mentioned that the Naga tribes are distinguished by the names of Boree and Abor—the former being dependent, and the latter independent tribes. To the eastward, however, the Boree Chiefs who acknowledge a kind of dependance on us, have numerous Abor tribes tributary to them, which I did not find to be the case to the westward. There is here, therefore, considerably great difficulty in ascertaining the merits of any dispute, in which one party are Boree, and the other Abor; the former being bent on preventing all kinds of intercourse between us and the Abor tribes. It is only when they meet with some reverse, that they ask for aid; and then it is probable, that they will do nothing, but in furtherance of their own ends, which are to slaughter their enemies, burn their villages, and drive them to the jungles.

Having taken engagements from all the Boree Chiefs to abstain from warfare, it seems necessary, that the officer, in charge here, should be furnished with instructions as to how far he should interfere in their quarrels. It is obviously desirable, that he should do so as little as possible, but in the following cases it seems necessary:—

1st. In any attack by one Boree tribe on another. In this case both parties might be summoned down, and in the event of refusal to come, or to settle the dispute as directed, their village might be occupied till they complied. 2d. In an attack by a Boree on an Abor tribe, dependent or independent of a Boree tribe. On proper complaint being made in a case of this kind, the same course might be followed. In both

cases, the parties complained against are our dependents, and we have a clear right to their submission.

These are the only cases in which it seems to me to be absolutely necessary that interference by force should take place. But in the event of a Boree complaining against an Abor tribe, every means might be taken-either through the Boree Chiefs, on whom they are dependent; or if not so dependent, through any Boree tribe which may be on friendly terms with them-to induce the Abor tribe to come down, and submit their dispute to adjustment. If this cannot be accomplished, I am of opinion, that interference should not take place; for I believe that in almost every case of the kind, the Boree tribe could point out means by which the Abors might be got down, and that it is for objects of their own, that they do not do so. Before leaving this part of the subject, I would beg to mention again, what I stated in the 7th paragraph of my letter of the 15th September 1841, that I believed the Assam Government had found it more convenient to conciliate the Nagas by presents, than to overawe them by coercion; and I am still of opinion that the Political Officer, who has charge of the relations with these tribes, should have power to dispense presents liberally.

I may here state, that the following applications have been made to me, since I returned to Seebsagur.

The Chief of Boora Hymoong, came in on the 9th of March, and reported that his village had been burnt and plundered by the Nagas of Losiatua, Booragaon, and Loougliooug; these were summoned through their Kutokies, but objected to come to the plains so late in the season. It turned out, however, that the matter had been much exaggerated, and that the affair originated in some claims of certain Nagas who had left Boora Hymoong, and settled in Booragaon. The Chief of Boora Hymoong afterwards acknowledged, that the Loougliooug Nagas had returned what they took away; and I hope that after the rains, the matter will be adjusted with the other parties.

On the same date, the Loongjang Chief complained, that two women of his village had been cut up in their fields by the Moongjing Nagas. The Kutokies were directed to summon the Chiefs of Moongjing, who also objected to come down to the plains at that season, and nothing further can be done till November or December next,



The Mulotopeah Chief came in on the 9th April 1844, and mentioned that his tribe were afraid to come to the plains, from fear of being waylaid by the Langtooug and Nowgong Nagas, on account of an old feud. This Chief said, he would come in again after the rains, and I hope to be able to adjust the matter to the satisfaction of the parties.

Besides these cases which have lately been brought to notice, there are the following, which I was unable to adjust while in the hills, from not being able to bring the parties together.

A feud between Mikilaie and Losuctuja early in 1834. The Chief of the former tribe complained, that 14 of his men had been cut up by the Hatheegurh Nagas. These denied all knowledge of the matter, and said it was probably done by the Soomtiya Nagas, who were at enmity with Mikilaee. The Soomtiya Nagas deny it, but allow that there is an old feud between their tribe and Mikilaee, and I will endeavour to bring the parties together at the earliest period possible.

About the beginning of December last, the Sonarree Chiefs complained that the Topoo and Tootee Abors had carried off and detained a boy and girl from their village; I had hoped to have settled this, but could find no means of getting the opposite party present. It would appear that the Nagas in this direction are in the habit of making captives, with a view to obtain ransom.

The following occurrences among the Nagas to the eastward have been brought to notice.

I received a report towards the end of November last, that the Paundwar, Makrong, and Singpoongiya Nagas, had cut up three men, belonging to Horoo Bansary. On enquiry it turned out, that Mokreng or Koting-gaon is tributary to Horoo Bansary; and that a Naga belonging to the former tribe had gone with tribute to the latter, and was put to death. The Koting Nagas shortly after this, cut up the three men alluded to. The Pandwar Chief came in himself, and stated that he was in no way whatever concerned in the matter; he thought the dispute might be settled through the Burdwar and Namsang Chiefs; and they were applied to, but I have not heard that they have yet been able to adjust it. Both parties in this case are Abors.

A report reached me at Boora Hymoong, that the Khetree Nagas had, on the 18th of January, attacked Boonting-gaon, burning the village and killing eight men. Both parties are Abors, and I fear there is



little chance of doing any thing in this direction, without the assistance of the Namsang and Burdwar Chiefs, who shew any thing but a readiness to give it.

On the Sth of April, a complaint was made to Mr. Bedford at Jaipore, by the Baufera Nagas, who stated that two men and a woman belonging to their village, had been put to death in Horoo Mootoon. An enquiry was immediately directed; and on the 24th of May, the Naga Chowtangs of both villages came before me, and stated that the parties put to death were slaves, who had run away from Baufera, and that according to the Naga custom, they had very properly been put to death. The Baufera Chowtang said, that this should have taken place in presence of both parties, and on the borders, and not at Horoo Mootun, but that the matter had been settled amicably among themselves.

On the 1st of May the Chowtang of Jaboka reported that he was fearful of being attacked by the Abors of Seuhoon, Roodooa, Kyouting, Poomau and Mijuo. A guard from the Assam militia was offered for their protection, but the Chowtang said it was unnecessary; that the village could take care of itself till the rains were over; and if matters were not adjusted then, he would make another report.

Before concluding this report, it may be convenient to refer to my reports of the 15th September 1841, and 9th April 1842, regarding the habits of the Nagas, their defences, arms, &c. and to observe that the observations made therein, will apply generally to the tribes I met with in my present tour. The villages we met with in the tour, are in general, large and thickly populated, the largest may contain from 4000 to 5000 inhabitants, and few could have had less than 2000.

The Naga country lying between the Diko and Dyang, is divided into six Dwars, as follows: Namsang, Dopdar, Charingaya or Asringiya, Hatheegurhiya, Dyungiya and Paneephat. A list of villages comprised in these Dwars, is appended.

The Nagas of Namsang Dwar enter the plains in Gelakee, and exchange cotton, cloths, ginger, pepper and beetlenut, for salt, rice, dhan, daws, cattle, poultry, and dried fish. These are the principal articles of exchange in all the other Dwars; but raw cotton is brought down by the westerly Dwars, particularly by the Paneeput or Lotah tribes; this cotton, or the bulk of it, is exchanged in the first instance by the above

Nagas to the Borees, for their own products and products of their plains, and it is then brought down by the Boree Nagas, and exchanged to the Assamese; a small quantity comes down at Dopdar, and larger quantities at the Dwars west of it.

The Dopdar, Charingaya, Hatheegurh, Dyungiya, and Paneephat Nagas, come down respectively by Dossdur, Taratollee, Morecomee, Bosa, and Mokrung. In Bosa and Mokrung there are several Passes.

To each of the Dwars are attached Kutokies, who are the channel of communication between the Government Officers and the Boree Nagas; these were formerly paid for their services by a remission of the poll tax, and they now receive a remission on their land, equal to what was remitted when the poll tax existed; some of them derive advantage from having the management of Khats, which the former rulers of Assam gave certain of the Naga tribes, and to which they attach importance; a list shewing the number of Kutokies, their allowances, and the Naga Khats, and quantity of land in each, as far as is known, is annexed to this report.

The Lotah Nagas had formerly Khats on the Morung side, and they are particularly anxious to obtain an equivalent for them on this side of the Dhunsuree. The Khats they formerly held are either out of cultivation, or taken up by the ryots; and I would recommend that they be allowed to take up from 30 to 40 Poorahs of any Puteet land they can point out. The value they attach to these Khats, is a great security for their peaceable behaviour.

Mr. Masters has kindly favoured me with his observations on the botany of that portion of the hills which we passed over, and which I have much pleasure in submitting with this report. Mr. Bedford has also made a most accurate map of our route, including all villages seen from it, which will be of great use hereafter. To both these gentlemen, I am under considerable obligations, for the assistance they gave me on many occasions.

Our tour was necessarily a very hurried one; I could have wished to remain longer in almost every place, but we started in rain, and had a good deal of it in the hills; and I was fearful of being driven down before I had completed the tour; and in fact continued and heavy rain set in immediately we left the hills. We have now, however, a knowledge of the localities of all the tribes on our borders, and for some distance



in the interior, and they can be visited at any time there may be occasion for it. It is hardly to be supposed, that a barbarous people, who have lived and gloried in war for ages, will at once leave off their wild habits; and no doubt we shall have to remonstrate with them frequently; but I have every reason to think, that less bloodshed now takes place than formerly, and it is to be hoped, that all these tribes will fall gradually into more peaceful habits.

I cannot conclude this report without again bringing to notice, the very great assistance I derived from Noramaee Deka Phokun, Naga Surburakar, in my dealings with the Chiefs who visited me. He was far from well when we started, and had frequent attacks of fever, but nothing would induce him to leave his post, and he continued with me throughout the tour, under circumstances in which few of his class would have remained.

I beg to submit a Bill for the expences incurred on the present expedition, which I beg you will recommend being passed.

P. A. Comr. Office; 6th Aug. 1844.



# एसियाटिक सोसाइट संस्कृत नागराक्षर् ॥

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लासनेन रचितं सर्व साधारण	8
गीतगोविन्द १ खण्ड	21
यज्ञदत्तवधः १ खण्ड ै	२२।
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## JOURNAL

OF THE

# ASIATIC SOCIETY.

#### DRAFTS FOR A FAUNA INDICA.

(Comprising the Animals of the Himalaya Mountains, those of the Valley of the Indus, of the Provinces of Assam, Sylhet, Tipperah, Arracan, and of Ceylon, with Occasional Notices of Species from the Neighbouring Countries.\*)

By Ed. Blyth, Curator of the Asiatic Society's Museum, &c. &c.

No. 1. The Columbidæ, or Pigeons and Doves.

Order IV. Gyratores, Pr. Bonap. Gemitores, McGillivray.

This consists but of a single family, that of the Pigeons,—

### Fam. COLUMBIDE,-

Which subdivides into three marked sub-families, viz.—Treroninæ, or arboreal fruit pigeons,—Gourinæ, or ground pigeons,—and Columbinæ, or ordinary pigeons and doves.

The object of publishing the present series of Monographs of various groups of animals, is to elicit, as much as to impart, information that might be incorporated in a general work now in preparation; and it is, therefore, earnestly requested that observers, interested in the subject, will favour the author with any additional facts or corrections that may occur to them, and that they will also endeavour to settle any questions that are still at issue, and in short, to render the future conspectus of Indian animals as complete as circumstances will permit of. In the class of birds, it may be here remarked, that any information on the nidification and colour of the eggs of species generally, and of the song-notes of the smaller *Insessores*, will be particularly acceptable.

No. 168. No. 84, New Series.

### Sub fam. TRERONINE.

The members of this group are eminently frugivorous and arboreal, scarcely ever descending to the ground, and some perhaps never, unless to drink;\* and in general they are of a green colour, which renders them difficult to discern amid the foliage of trees. are distinguished from other pigeons (with the sole known exception of Ectopistes carolinensis,) by having constantly fourteen tail-feathers, instead of twelve.+ In form of bill, they present a gradation from the strongest beak that occurs throughout the order, to a feeble organ, soft and tumid to near its tip, which alone is corneous; but the gape, especially in the latter case, is very capacious. The tarsi are short, stout, and more or less feathered; and the toes (except in one sub-genus) are remarkably broad-soled, and are furnished with strong and sharp claws, commonly much hooked; hence they have great power of clasping, or holding on to the small branches of trees, while straining to pluck the fruit or berries from the terminal sprays; so that, when feeding, these birds may be commonly observed to lean over and downward so far as to be inverted, and then draw themselves back by the unaided muscular strength of the extremities. The flight of all is powerful and rapid. Three strongly marked genera occur, numerous species of which inhabit the warm regions of the Old World, Australia, and Polynesia; but from America they are wholly excluded.

Genus TRERON, Vieillot: Vinago, Cuvier. (Hurrial and Hurrwa, H.; Hurtel, Beng., N'goo, Arracan). The HURRIALS.

In this genus may be observed the gradation in form of bill, that has been adverted to, in its full extent; but all the strong-billed species are here included. The plumage is blent and glossless, and almost without exception of a lively green, varied with ashy, and with a stripe of bright yellow on the wings margining their coverts; while the males are commonly further adorned with a deep maronne hue; on the

<sup>\*</sup> An individual of Treron bicincta, has been seen feeding on the ground; but such instances are extremely rare. Vide, also, description of Tr. nipalensis.

<sup>†</sup> Perhaps, however, certain of the ground pigeons may also have more than twelve tail-feathers; which remains to be ascertained. In the domestic breed of fan-tails, the number is abnormally multiplied to as many as thirty or more. It is very remarkable that of the two species of Ectopistes, which are nearly allied to each other, one should have fourteen tail-feathers, while the other—the celebrated passenger pigeon of North America, should possess but the usual number—twelve. This fact was observed and recorded by the Prince of Canino.

<sup>‡</sup> This hue, in different shades of vinous, or claret-colour, occurs in a great number of Columbidæ, and has been remarked to be almost peculiar to the tribe.

mantle, and with orange, or orange and lilach, on the breast. crimson, with a blue ring encircling the pupil.\* The voice, a melodious deep-toned whistle, considerably prolonged and varied in different cadences. Nidification, as in most other arboreal doves and pigeons, and two white eggs produced, of a somewhat less elongated shape than in common pigeons. Except in the pairing season, these birds collect in small, or moderately large flocks, on the topmost branches of high jungle trees, where, if one can be descried and is shot at, two or three will commonly fall, that had eluded observation from the similarity of their colouring to that of the foliage. They subsist on fruits and berries of all kinds, and during the season, especially on the small figs of the Ficus indica and F. religiosa; and they have likewise been observed "devouring the blossoms and newly formed fruit of the mangoe and tamarind trees." Their flesh is esteemed for the table, but the skin requires to be removed, this having a strong bitter taste; and hanging them up for a day or two, when the season will permit of it, improves them much for culinary purposes.

It is necessary to distinguish three well marked sub-genera, as follow,-

A. TORIA (since altered to Romeris), Hodgson. Distinguished by the great strength and vertical depth of the corneous terminal portion of the beak, which, in the typical species, is continued back to beyond the feathers of the forehead. The eyes are surrounded by a naked space.

TR. NIPALENSIS: Toria nipalensis, Hodgson, As. Res. XIX, 164. (T'horya, quasi rostrata, of the Nepâlese.) Green, yellowish below and towards the tail; the crown of the head ash-coloured; mantle of the male, deep maronne-red, and a faint tinge of fulvous on the breast; primaries and their larger coverts, black, the latter margined with yellow; middle tail-feathers green, the rest with a blackish medial band, and broad grey tips; lower tail-coverts cinnamon-coloured (more or less deep) in the male; subdued white, marked with green, in the female. Bill, greenish-white, with a large vermillion spot occupying the membrane at the lateral base of the mandibles; legs also vermillion:

<sup>\*</sup> A partial exception to this occurs in Tr. nipalensis only, among the Indian species; at least, the only two living specimens of this bird which I have seen, had dark red-brown irides, with a blue inner circle. Mr. Hodgson describes them as—"outer circle of the iris orange-red, inner circle blue."

irides deep red-brown, with a blue inner circle; and orbital skin, bright green. Length, ten inches and three-quarters, by seventeen inches; closed wing, five inches and three-quarters.

This bird inhabits the central and lower hilly regions of Nepal, and more abundantly, those of Assam and Arracan, spreading southward to the Tenasserim provinces and Malay peninsula. It also occurs in the hilly districts of Bengal, but rarely strays into the plains, though specimens are, occasionally met with even near Calcutta. Mr. Hodgson states that—"It is not very gregarious; adheres to the forests; feeds chiefly on soft fruits; and prefers the trees to the ground, but without absolute exclusiveness of habit in that respect."

Most closely allied and hitherto confounded with it, is Tr. aromatica of Java, and I believe of the more eastern portion of the Malayan Archipelago generally, (the Col. curvirostris, and the female-C. tannensis of Gmelin).\* The latter differs by having a bright yellow beak, greenish at sides towards base, and the nude skin at the sides of its base is apparently blue. fading into a blackish tint in the dry specimen; while in Tr. nipalensis the vermillion colour fades to amber; the anterior half of the crown is much more albescent; the fulvous tinge on the breast much stronger; the maronne colour of the back is more extended; the longest tertiaries are greenish-dusky, instead of green; and the lower tail-coverts are of a deeper cinnamon-colour. Lastly, the corneous portion of the upper mandible scarcely extends quite so far back as in Tr. nipalensis; and a curious and marked distinction consists in the Indian species, having the inner web of its third primary sinuated, as in the Hurrials of the next section; while its closely allied Javanese representative exhibits no decided trace of such a character. In a third species which I refer to this section, the Tr. Capellei, Tem.+ (common near the Straits of Malacca), the beak is lengthened by the prolongation of its soft and tumid basal portion, becoming, as remarked by Mr. Strickland, "almost vulturine in form;" while the size of the bird is considerably larger,

<sup>\*</sup> Mr. G. R. Gray's figures of the beak, &c., of a species of Hurrial to which he applies the name aromatica, in his illustrated work on the genera of birds, refer to a species of the following section of this genus.

<sup>†</sup> Treron magnirostris, Strickland, An. and Mag. N. H., 1844, p. 116, and doubtless Vin. giganteus of Raffles, mentioned in the "Catalogue of Zoological specimens" appended to Lady Raffles's 'Life of Sir St. Raffles,' p. 674; though not the bird referred to in the note attached, which is probably a Carpophaga.

and, it may be added, that the sinuation of the interior web of its third primary exists, but not to the same depth as in Tr. nipalensis.

B. Typical Treron. Hurrials, with the beak moderately robust, much less so than in the preceding section, its corneous portion occupying the terminal half, or thereabouts. There is no bare space round the eyes; and the tail is squared. Sinuation of the third primary well developed in eight species examined, and probably, therefore, throughout the group.

TR. PHENICOPTERA: Col. phanicoptera, Latham: C. militaris, Tem. : C. Hardwickii, Gray (figured in Griffith's 'Animal Kingdom,' VIII. 299): Vinago militaris, Gould's 'Century', pl. INIII.\* Green. The neck all round, with the breast, bright yellowish-green, having a shade of fulvous; cap, sides of base of neck, and the abdominal region, ashgrey, the belly, with generally some admixture of green, more or less developed, and there is a green tinge on the forehead; shoulder of the wing lilach in the male, and a trace of the same in the female; greater wing-coverts margined with pale yellow, forming an oblique bar across the wing; terminal two-fifths of the tail, ash-grey above, albescent underneath, and its medial portion blackish underneath, and deeply tinged with green above; tibial plumes (extending partly down the tarse) and central abdominal feathers between the tibiæ, bright yellow; vent mingled white and green; and lower tail-coverts maronne, with white tips. Beak, whitish; the feet, deep yellow. Length twelve and a half, by twenty-two inches; and of closed wing seven inches to seven and a half.

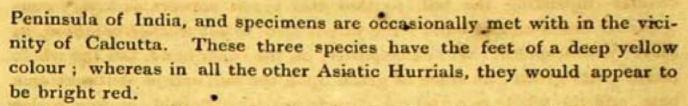
This is one of three closely allied species, each having its peculiar habitat, and it is intermediate in its colouring to the two others,—namely, Tr. viridifrons, nobis, of the Tenasserim provinces, and Tr. chlorigaster, nobis, of Peninsular India. Tr. viridifrons is distinguished by having the anterior half of the head, and the medial portion of the tail, of the same (and as bright) yellowish-green as the breast, though somewhat less fulvescent; that of the tail being well defined, and contrasting strongly both with the grey tip, and also with the grey

<sup>•</sup> Mr. G. R. Gray identifies this bird with Col. Sta. Thomae of Gmelin, to which name he assigns the precedence: but I decidedly think that he is mistaken in so doing.—I perceive also that in Griffith's 'Animal Kingdom,' Col. Sta. Thomae is referred to militaris of Temmink; this last named author having stated that C. Sta. Thomae occurs in India.

coverts impending the tail, so that this green appears as a very conspicuous broad caudal band : the throat also is not weaker-coloured, as in Tr. phænicoptera. Tr. chlorigaster, on the other hand, has the whole under-parts green; no trace of green upon the tail, except at its extreme base, and the whole cap and ear-coverts are ashy, devoid (in fine males at least) of the slightest tinge of green on the forehead. These are, in fact, three osculant races, which, if commonly inhabiting the same districts, would doubtless intermix and blend, like Coracias indica and C. affinis, and likewise certain of the Kalidge pheasants (Gallophasis); but within their own proper range of distribution, each continues true to the colouring which distifiguishes it from the others. To term them local varieties of the same species, would not merely imply that the three are descended from a common origin, but also that such changes of colouring are brought about by difference of locality; a notion which is inconsistent with the fixity and regularity of markings we observe in either race, over an extensive and diversified range of country. phænicoptera is a very abundant species in Bengal, Assam, Sylhet, Nepal, and all Upper India, its range extending southward at least to the foot of the mountains of Central India, where it would seem to be equally common with the next, and intermediate specimens are met with even in Lower Bengal. In Arracan it does not appear to have been met with, but farther southward, in the Tenasserim provinces, it is represented by its other near affine, Tr. viridifrons.\*

TR. CHLORIGASTER, nobis, J. A. S. 1843, p. 167: Tr. Jerdoni, Strickland, An. and Mag. N. H., 1844, p. 38: Vinago phænicoptera v. militaris of Southern India, Auctorum. Similar to the last, except in the particulars already mentioned. It replaces Tr. phænicoptera in the

<sup>&</sup>quot;Capt. Hutton writes me word from Mussocree, that Treron phænicoptera is "common in the Deyrah Doon; but never mounts into the hills, where it is replaced by Tr. sphenura. Many of the Doon birds" he adds, "have come to be regarded as hill species, from their commonly occurring in collections made by residents at the different hill stations. Such collectors, however, entertain one or more shikarrees, who start off sometimes to the Doon, sometimes to the interior of the mountains, just as they happen to remember or to want any bright-coloured bird; and when the collection is brought in, the collector never dreams of asking where the birds were shot, but puts them all down together as a collection from the hills. Nepal being further to the south-east then Mussocree, a greater elevation may be required to produce the same temperature that we have; so that birds, which with us are found only in the warm valley of the Doon, may perhaps in Nepal rise to a certain elevation on the mountains!"



TR. BICINCTA: Vinago bicincta, Jerdon, Ill. Ind. Orn. Pl. XXI; Madr. Journ. 1840, p. 13, (the male); and V. unicolor, Jerdon, ibid. (the female) : V. vernane, var. Lesson's Traité. (Chota Hurrial, · Hind, -Bengal). Green: the forehead and throat, brighter and more yellowish, as are the whole under-parts of the female, passing in both sexes to bright pale yellow towards the vent; occipital region, ash-grey; a stripe of yellow along the wing, formed by the margins of the greater and outer coverts; tail, grey above, with a blackish medial band on all but its middle feathers; beneath blackish, tipped with greyish-white; . and its lower coverts, cinnamon-coloured in the male, and mingled dusky-ash and buffy-whitish in the female. The male is further distinguished by having a large buff-orange patch on the breast, and above this a lilach band, broader at the sides. Bill, greenish-glaucous: and the legs deep pinkish-red. Length eleven or twelve inches, by twenty, or nearly so; and of wing generally about six inches, rarely as much as six and a half.

This beautiful species is common to all India, but would seem to be more numerous in Lower Bengal than in the Peninsula; and it occurs plentifully in Nepal, Assam, Sylhet, Tipperah, Arracan, and the Tenasserim Provinces. In Bengal, however, it is much less numerous than Tr. phanicoptera; and the flocks of the two species do not commingle. I once found its nest, half-way up a small mahogany tree, in the Calcutta Botanic Garden. The eggs, of a somewhat less lengthened form than in pigeons generally, measured an inch and a quarter in the long diameter. I have also obtained the young, which resemble in colouring, the adult female. The voice is much the same as in Tr. phanicoptera.

Mr. G. R. Gray has erroneously identified this bird with Tr. vernans, (L.), common in the Malay countries. The latter differs in its smaller size, having the wing but five inches and a half; in the male having the entire crown and throat grey, instead of green; in the very much greater development of the lilach colour above the orange of the breast, this enveloping the whole neck, whereas in Tr. bicincta, it is confined to a band above the breast; and in the tail being grey above, with a blackish terminal band, and slight greyish extreme tips to the feathers; whereas,



Tr. bicincta has a broad whitish terminal band to the tail, as seen underneath, and which appears of a dull ash-colour above. No two species can be more obviously distinct.

TR. MALABARICA: Vinago malabarica, Jerdon, Ill. Ind. Orn. (Art. V. bicincta): V. aromatica, apud Jerdon, catal. (the male); and V. affinis, Jerdon, ibid. (the female): also V. aromatica of Southern India, Jardine's Nat. Libr., Columbidæ. This bird exactly resembles Tr. nipalensis in size and colouring, except in having a yellower throat in both sexes; but is at once distinguished by the very different form of its beak, and by having no naked space round the eyes; the buff tinge on the breast of the male is also more decided; and its legs are 'lake-red.' The female may be distinguished from that of Tr. bicincta, by the ash-colour of its forehead and entire crown, and by its unspread tail being wholly green above.

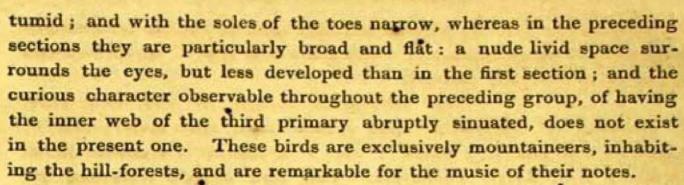
Mr. Jerdon's specimens of this bird were obtained on the Western Coast of the Peninsula, and at the foot of the Neilgherries. I have never seen it from Northern India; but to the eastward it inhabits Assam,\* Sylhet, Tipperah, and appears to be equally common with Tr. nipalensis in the island of Ramree, Arracan.

There is a nearly allied species in the Nicobar Islands, Tr. chloroptera, nobis, which differs in its superior size, having the wing seven inches, instead of six to six and a quarter; and in the male having a large portion of the fore-part of its wing green, instead of deep maronne; its breast also is less tinged with fulvous, and the forehead more albescent.

Columba pompadora, Gmelin, founded on Pl. XIX and XX of Brown's Zoology (1776), should be another nearly allied species, inhabiting Ceylon: but as both figure and description represent the back to be green, instead of maroane, like the rest of the mantle; and as it is also described as "smaller than the turtle-dove," it clearly cannot be Tr. malabarica, and is probably a sort of representative (as regards its diminutive size) of Tr. olax of the Malay countries.

C. SPHENURUS, Swainson: Sphenocercus, G. R. Gray. Hurrials with cuneiform tail, of which the central feathers are, in some species, much elongated beyond the rest, and their prolonged tips attenuated; with the basal two-thirds or more of the bill soft and

<sup>\*</sup> It is figured among Dr. McClelland's drawings of the birds of Assam.



TR. SPHENURA: Vinago sphenura, Vigors, Proc. Zool. Soc. 1831, p. 173; Gould's 'Century,' pl. LVII: Kokla, or Kokhela, H. (a name also applied to the next species). Very similar in colouring to Tr. nipalensis and Tr. malabarica, but larger, and at once distinguished by its cuneiform tail; by the greater development of the soft basal portion of its bill; also by the green colour tinged in the male with buff of its crown; by the considerable diminution of the maronne colour on the mantle of the male, especially on the back, the posterior scapularies, the tertiaries, and the great wing-coverts, being green; and by having but a slight pale yellow margin to only the great coverts of the wing. Tail, green above, with an ill-defined subterminal dusky, band to its outer feathers, and uniform dull albescent-grey, underneath; its lower coverts long, and of a pale rufous-buff hue in the male, yellowish-white with green centres in the female, as are likewise the short outer ones of the male: breast of the latter, deeply tinged with buff. In the female, the subterminal dusky band on the three outer tail-feathers, is much better defined. Irides, coloured as usual; the bill, and nude skin around the eye, livid; and legs, coral-red. Wing, seven inches to seven and a quarter: middle tail-feathers, five and three-quarters.

This species inhabits the Himalaya, and is, I believe, more abundant in the south-eastern portion of the chain, as in Nepal and at Darjeeling; though it is also common at Simla. Capt. Hutton writes, from Mussoorie,—"This species is very numerous in the hills from April to June, when, having reared its young, and the rains having set in, it becomes scarcer, and gradually disappears during the rainy season. The nest is in high trees, composed of dried twigs, a mere platform; and the eggs are two, and white. I heard the first Kooklah this year on the 12th of April." It is greatly prized by the natives as a cage-bird, on account of its singularly prolonged and varied musical note, which is an improvement upon that of Tr. phænicoptera and its allies. A few are even brought in cages to Calcutta, and sell at a high price, as song-birds.



I have heard the notes of both this and the next species, which I think are absolutely similar: they bear some resemblance to the human voice in singing, and are highly musical in tone; being considerably prolonged and modulated, but always terminating abruptly; and every time the stave is repeated exactly as before, so that it soon becomes wearisome to an European ear.

TR. CANTILLANS: Vinago cantillans, nobis, Journ. As. Soc. XII, 166: Col. aromatica, var. A. Latham. Size and proportions of last, but the green colour replaced by a delicate pearl-grey, with a slight tinge of green here and there, more especially on the under-parts: forehead and throat whitish: the crown and breast of the male tinged with ruddy, or weak maronne; and the mantle marked as in Tr. sphenura, with deeper maronne: a slight yellowish-white outer edging to the greater wing-coverts. Irides, as usual in this genus, or having a crimson ring encircling a violet one: bill and bare skin around the eye, glaucousblue: and legs and toes, reddish-carneous. The female I have not yet seen. Length, thirteen by twenty-one inches; closed wing, seven inches.

This species occurs in the N. W. Himalaya, as about Simla; and is, I believe, rare in Nepal. I kept one alive for some time, that was stated to have been brought from Agra; whither it had no doubt been carried from the Hills. Can it be a variety only of the last?

TR. APICAUDA, Hodgson (mentioned in Mr. G. R. Gray's Catalogue of the Ornithclogical Specimens in the British Museum). Nearly allied to Tr. oxyura of the Malay countries, from which it is at once distinguished by the pale yellow margins of its great wing-coverts, forming two narrow longitudinally oblique bars on the wing. General colour green, more yellowish towards the tail, and on the under-parts; and tinged in the male with russet on the crown and breast: primaries, dusky-black: tail with its middle feathers greatly prolonged beyond the rest, and their elongated portion much attenuated; its colour, grey with a medial blackish band, obsolete on the middle pair of feathers, which at base are yellowish-green. Bill, evidently glaucous-bluish; and legs red. Length of wing, six inches and a half, and of middle tail-feathers, eight inches or more, passing the next pair by about three inches.

Inhabits the south-eastern Himalaya and the hill ranges of Assam; being tolerably common at Darjeeling.



Genus CARPOPHAGA, Selby (1835): Ducula, Hodgson (1836).

Dukul, or Dunkul, H. The Dunkals.

These fruit pigeons are mostly of large size, with broad-soled feet and strong hooked-claws, much as in the typical Hurrials, and a slender, generally somewhat lengthened, bill, having the terminal third only of its upper mandible corneous, and the plumage of the chin advancing very far forward, underneath the lower mandible. In a few species the base of the upper mandible expands to form a fleshy knob. Wings, in all the typical species, adapted for powerful flight. The plumage of the head, neck, and under-parts, and in some species, throughout, is blent and glossless, and mostly of a delicate grey, or a vinous hue, with never the peculiar burnish on the sides of the neck, so general among ordinary pigeons; but many species have the upper-parts, wings, and tail, shining metallic green, which in some is bronzed or coppery, in others varied with rich steel-blue; hence, several are among the most shewy of the pigeon tribe; others, however, being simply black and white, though all are alike handsome when viewed in the fresh state, from the delicate beauty of the irides, bill, feet, and any nude skin about the head, the exquisite colouring of which is lost in the dry specimen. These birds are more especially developed in the great Oriental Archipelago, where the species are very numerous, two only occurring in India, and others in Australia and Polynesia. They are gregarious, like the Hurrials, and keep exclusively to the great forests, more especially to those of upland districts: and it would appear that they do not generally lay more than a single egg, and certain species invariably but one; in which respect they resemble the celebrated Passenger Pigeon of North America (Ectopistes migratoria). At least three sub-genera occur, at the head of which may be placed Lopholaimus, G. R. Gray, founded on the Col. antarctica, Shaw (v. dilopha, Tem.), of Australia; then follow the ordinary Dunkuls, of which the two Indian species are characteristic; and finally a short-winged type, with bill and feet as in the former, and colouring as in the division Chalcophaps (of the next subfamily), to which I apply the appellation Dendrophaps.

C. INSIGNIS: Ducula insignis, Hodgson, As. Res. XIX, 162: Carp. cuprea, Jerdon, Madr. Journ. 1840, p. 12, and subsequently referred by him to Col. badia, Raffles, ibid. 1844, p. 164. (Dukul, Nepal; Dunkul, H). Head, neck, and under-parts, pale ruddy lilach-grey; the

throat, albescent; and crown, pure cinereous in some specimens, in others tinged with ruddy; back and wings, deep vinaceous-brown; the rump and upper tail-coverts dusky-cinereous, and the lower tail-coverts buffy-white; tail dusky, with its terminal fourth dull-ashy above, and albescent as seen from beneath. Bill, circle of eye-lids, and legs, intense sanguine, except the tip of the bill and the claws, which are horn-coloured; orbital skin, livid; and irides, "hoary or blue-grey," according to Mr. Hodgson,—"red," as stated by Mr. Jerdon. Length, twenty inches, by two feet and a half (Hodgson); nineteen by twenty-six inches (Jerdon); of wing, nine inches and a half; and of tail, eight inches. Weight, a pound and a half. "The female," remarks Mr. Hodgson, "is a fourth smaller than her mate, wants almost wholly the rich vinous tint of the male, and is, generally, more obscurely coloured."

This diversity of colouring of the sexes reminds us of the Hurrials: and it may be remarked, that the general tints are not very different from those of Treron cantillans. The species inhabits the Himalaya and the Neilgherries; and Capt. Phayre has obtained it in the Ya-ma-dong mountains, which separate Arracan from Pegu. It appears to keep always to a more elevated region than the next species, as near the snow line of the Himalaya; and Mr. Hodgson states that it is "almost solitary" in its habits.

The Col. badia. Raffles, v. capistrata, Tem., of the Malay countries, would appear to be very closely allied in its colouring, but considerably inferior in size: the two are regarded as distinct by Mr. G. R. Gray.

C. SYLVATICA: Col. sylvatica, Tickell, Journ. As. Soc. II. 581: C. ænea of India, Auctorum; but not of Raffles, Lin. Tr. XIII. 316. (Dunkul, H.; Pyoon-ma-dee, Arracan.) Head, neck, and under-parts, pearl-grey, purer on the crown and breast, and tinged elsewhere (and occasion-ally on the crown) with riddy-vinaceous: back, wings, rump, and tail, shining coppery-green, with a dash of grey on the large alars, and greenest upon the tail; under tail-coverts, dark maronne: chin, and immediately around the base of the bill, white. "Irides and orbits, lake-red; bill slaty, at base above red, at tip bluish-white; legs lake-red." (Jerdon.) Another observer describes the irides to be "deep pink;" but Capt. Tickell writes—"Eyes, orange; feet, rose-coloured; bill, horny, bluish over the nostrils." Length, eighteen or nineteen inches; expanse, two

feet and a half; closed wing, nine inches to nine and a half; and tail, six inches to six and a half; sexes alike.

"This fine species," remarks Mr. Jerdon, "is found in all the lofty forests of the west coast, single or in small parties of three or four. It has a single, low, "plaintive note." Capt. Tickell, in his 'List of birds collected in the jungles of Borabhúm and Dholbhúm,' states that it is "common in some parts; preferring the open and large-timbered tracts. They are wild and difficult of approach, and go generally in small parties of four or five. The voice is deep, and recembles groaning." I have never seen it from the Himalaya; but it is very abundant in the hill regions of Assam, Sylhet, Tipperah, and Arracan; also in the Tenasserim provinces; and the Asiatic Society has received it from Java. A writer in the 'Bengal Sporting Review' (No. II. p. 89,) observes-" The habits of this handsome bird are strictly arboreal; it is seldom seen but in the depths of the jungle; is gregarious, like the Hurrials, but is only a cold weather resident in the eastern districts of Bengal, and breeds elsewhere.\* It makes its appearance in November, and leaves towards the end of March. Its favourite food consists of the bijer plum (Ziziphus jujuba), and a jungle berry, called by the natives Anygootah. When wounded, it evinces more spirit than the Columbidæ appear generally to possess; erecting the feathers of its head and neck, and buffeting with its wings the hand that captures it. note is harsh, not unlike the croaking of a bull-frog."

There are several closely allied species: C. anea, as figured (i. c. the head,) by Mr. G. R. Gray, in his illustrated work on the 'Genera of Birds', has a large round knob at the base of its upper mandible, of which the Indian species never presents the slightest trace; and a beautiful specimen before me, from Borneo (?), exhibiting this knob, differs also from the Indian species in several other particulars.† Another, from the same region, exactly resembles the Indian species, except in its inferior size, having the wing but eight inches, and the rest in proportion; this is doubtless the C. anea of Raffles's list, described as "exceeding fifteen inches in length": so that, in Sumatra, there would appear to be closely allied diminutives of both the Indian species. C. perspicillata of Java and the Moluccas also approximates a good deal, but is readily enough distinguishable.

<sup>\*</sup> Mr. Frith found a nest of this bird in the Garrow hills.

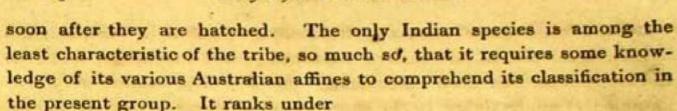
<sup>+</sup> It seems to be the " Sumatran Pigeon, No. 12," of Latham.



Of the third great genus of fruit-eating pigeons, Ptilinopus, also largely developed in the eastern Archipelago and Polynesian Isles, no Indian species has been discovered; the Pt. Elphinstonii of Sykes (seemingly) appertaining to the same group of ordinary pigeons as the British Cushat or Ring-dove.

#### Sub-fam. Gourina, Ground Pigeons.

The great series of ground pigeons and ground doves, presents a marked gradation in form and character, from genera allied (excepting in the form of the feet) to the Carpophaga and Ptilinopodes of the preceding sub-family, to others which exhibit a nearer relationship to the species of the next sub-family. The size also varies remarkably, as both the largest and smallest pigeons known, are comprised in this group; some attaining the magnitude of a hen-turkey, while others are scarcely bigger than a sparrow. These birds are of a shorter, more full, and grouse-like figure, than that of other pigeons, having the wings more or less rounded, and even bowed or hollowed in some instances; the tarsi comparatively elongated, and the toes long and adapted for ground habits. Some even much resemble partridges in their mode of life: but even these, for the most part, prefer the cover of low brushwood (as do also many partridges), the haunts of different species varying; and other genera are completely sylvan in their abode, feeding on the ground, more especially on fallen fruits and berries. Such are the magnificent Gouras, or great crowned pigeons (Goura coronata and G. Stoursii.) of the Moluccas and New Guinea, which in their plumage and colouring approximate Treron cantillans and Carpophaga insignis; and the elegant hackled ground pigeons (Calanas), one of which (C. nicobaricus) abounds in the forests of the Malay peninsula, and in the Nicobar, Andaman, and Cocos Isles, thus almost verging on the eastern boundary of the territory whose fauna we here treat of. The general resemblance of this bird to Ptilinopus is striking in the living specimens of both; and from what I have observed of it in confinement, I have great reason to doubt the current statement that it ever lays more than two eggs, the number so usual in the pigeon family: indeed, I think there is present reason to be sceptical of the statements that any pigeon lays more than that number; though it is certain that several of the Gourinæ are clad with down at an early age, and follow their parents



CHALCOPHAPS, Gould, (apparently a sylvan sub-genus of Phaps, Selby, exemplified by the common Bronze-wing of Australia).

CH. INDICA: Columba indica, Lin.: C. pileata, Scopoli: C. javanica (?). cyanocephala, et albicapilla, Gmelin: C. cyanopileata, et griseocapilla, Bonnaterre : C. superciliaris, Wagler. (Ram-G'hoogoo and R'haj-G'hoogoo, Bengal; Gyo-ngyo, Arracan.) Back and wings, emerald-green, glossed with aureous; the feathers distinct and scale-like: neck, breast, and under-parts, vinaceous-brown, paler below, and of a duller hue in the female; two broad dusky bars, alternating with greyish-white, on the rump: tail, dusky in the male, its outermost and penultimate feathers whitish-grey, with black subterminal band: primaries, dusky: forehead of the male, white, passing as a supercilium over the eye; the crown of the head, ash-grey: a white bar near the angle of the wing; and lower tail-coverts, ashy, the longest, brown-black: inside of the wings, reddish cinnamon-brown. The female has a greyish-white forehead, much less developed than in the other sex, and a narrow whitish supercilium; crown of the head, rufescent; no white bar at the shoulder of the wing; the tail tinged with ferruginous; and the neck and underparts are browner than in the male. Irides, dark : bare skin around the eyes, deep purplish-carneous, as are also the legs; and the beak is bright coral-red, except towards the nostrils, where somewhat dusky. Length, ten inches and a quarter, by seventeen and a half: and of wing, five inches and a half to five and three-quarters.

This beautiful ground dove is common in thick jungly situations, and especially among dense bamboos, throughout the country; and it is equally abundant in the Malayan Archipelago. A writer before cited, remarks,—"The rapidity of flight it exhibits, exceeds that of any bird I am acquainted with; except, perhaps, the brief decisive swoop of some of the smaller Falconidæ: as in the progress of the latter, there is no apparent motion of the wings, but gliding along a few feet from the ground, diverging or rising just sufficiently to clear intervening obstacles, the ground dove skims with an arrow-like swiftness, and is come and gone in an instant; scarcely giving the eye time to detect what has crossed the field of vision. When settled on the ground, however, it shews no



unusual degree of fear, and may be approached near enough to notice its motions and brilliancy of colouring. Bare spots about the roots of large trees, particularly of the tamarind, appear to be favourite resorts; and a pair will be occasionally found sunning themselves, arranging their plumage and scraping up the earth, and beating up the dust with expanded wings, after the manner of the Rasores, upon an old b'heetah—the artificially raised mound of a deserted village. They soon become reconciled to confinement; and the voice is plaintive and monotonous, like an oft-repeated low tone on a distant flute."\* The nest of this species I have never seen, but am informed that it is built in low thorny trees, and often in bamboo jungle: the eggs are two in number; and one taken from the oviduct (April 30th,) measures just an inch long by three-quarters of an inch across, and is of a less pure white than those of ordinary pigeons and doves.

There is a nearly allied species in Australia, the Col. chrysochlora, Wagler, which Mr. G. R. Gray conceives to be the true Col. javanica of Gmelin. One character by which it may always be readily distinguished, is the total absence of white on the forehead of both sexes. The rapidity of flight so remarkable in the Indian species, as compared with our other Columbidæ, is equally observable in other sub-genera of Phaps, which might include even Peristera of Swainson.†

# Sub-fam. COLUMBINE.

This consists of the ordinary pigeons and doves, the characters and habits of which are familiar to all. They are mostly arboreal, though

<sup>\* &</sup>quot;Columbidae of the Eastern Districts."- Bengal Sporting Review, No. 1V, 1845.

<sup>†</sup> A curious pigeon, in the guise of a Pterocles, is figured among the drawings prepared under the superintendence of the late Sir Alexander Burnes and Dr. Lord, marked Fahktuk (i. e. Facktah or dove, Hind.), from Cabul, which should be sought for in the Scindian deserts. Total length about a foot, the wing six inches and a half, and tail pointed and Pterocles-like, extending nearly two inches beyond the tips of the wings: tarsi and toes, which, though rudely drawn, would appear to be those of an ordinary pigeon, naked, and of a pink colour. Bill dusky, being also apparently that of an ordinary pigeon, and rather slender. General colour light isabelline, with darker margins to the feathers of the mantle and wings; neck, breast and underparts, plain, the breast rufescent, and the belly and lower tail-coverts whitish; the outer tail-feathers would appear to have black tips: irides crimson. Should this hereafter be verified, and constitute (as seems probable) a new genus of sand-doves, having the habits of the Gangas or Sand-grouse, it might bear the name Psammænas Burnesii.



many of them feed much on the ground, chiefly on grain and oleaginous seeds; some of the species also nipping the young sprouts of vegetables. They fall into two principal and nearly allied series, those of the pigeons and the doves; the latter subdividing into several well marked groups.

Genus COLUMBA, Lin. (as restricted). Pigeons. (Kubbooter, H.; Paira, B.)

These are of comparatively large size, and generally more robust in make, with square or subquadrate tail. The Indian species fall into two subgenera, viz.—rock pigeons, and wood pigeons: the former exemplified by the common house pigeon, the latter by the common Cushat of Europe.

ROCK PIGEONS. In these, the tarse is rather longer, and the toes are better adapted for walking on the ground. They rarely, if ever, perch on trees, except under peculiar circumstances, as when a dove-cot of domestic pigeons is placed near a tree, with large and conveniently shaped boughs, in which case the pigeons will commonly resort to the latter to sit and roost, but never to form their nests. In the wild state, it is probable that they never perch at all; retiring to roost and nestle in caverns and small hollows of rocks or sea-cliffs, in the absence of which they select buildings that offer suitable recesses, breeding in the capitals of pillars, and whatever other convenient nooks they find. Hence, when unmolested, these house pigeons soon become familiarized with man, and require little encouragement to merge into the domestic condition.

C. INTERMEDIA, Strickland, An. and Mag. N. H. 1844, p. 39: C. anas of India, Auctorum: C. anas, var., from Tartary, Wagler. (Jalalaya, H.; Parwa, Mahr.; Golah, of the pigeon-dealers.) (Indian Rock Pigeon.) The common wild blue pigeon of India is most closely allied to the European C. livia, but is of rather a deeper slaty-grey, with invariably a deep ash-coloured rump; whereas C. livia has, as constantly, a pure white rump: there appears to be no other distinction between them; unless it be that the play of colours on the neck is finer in the Indian bird. The same difference in the colour of the rump is observable in the domestic pigeons of the two countries, whenever these tend to assume the normal colouring; for the tame Indian pigeons are as clearly derived from the wild C. intermedia, as those of Europe are from C. livia.

Colour slaty-grey, darker on the head, breast, upper and lower tailcoverts, and tail, which last has a blackish terminal band not well



defined; nuchal feathers divergent at their tips, and brightly glossed with changeable green and reddish-purple; two black bars on the wing\*; the primaries tinged with brownish, and the outermost tail-feather having its external web gradually more albescent to the base. Irides, brownish-orange; the lids bluish-white: bill black, with a white mealiness at the tumid base of its upper mandible: and legs reddish-pink. Length, thirteen by twenty-three inches; of wing, eight inches and three-quarters.

Mr. Jerdon rightly remarks—"The blue pigeon abounds all over India, being occasionally found in the more open spaces of jungles, especially in rocky districts, and in the neighbourhood of water-falls; but more generally in the open country, inhabiting walls of villages, pagodas, wells, and any large buildings, and breeding chiefly in old walls." Another observer, writing of it in the eastern districts of Bengal, remarks,—"Large colonies of these birds inhabit every moogur, mhut, and mass of ruins in the country, where, in company with the (house)

\* In some specimens, particularly among the semi-domestic, slight dusky streaks occur on the shafts of the lesser wing-coverts, which, in the latter, are often much more developed, spreading across the feathers and spotting the whole wing: such birds much resembling (except in the rump not being white) a race of wild pigeons that are abundantly brought at times to the London markets—all of them shot birds; but the latter have not, in addition, the two black bands on the wing well defined, as seems to be regularly the case with this variety of C. intermedia. Moreover, in the English bird, the spotting of the lesser wing-coverts does not occur on the shafts of the feathers, but partly margins each web, excepting near the edge of the wing, where the feathers are unspotted. I suspect that the wild rock pigeons of the south of England are mostly of the kind alluded to, which may be designated C. affinis; while those of North Britain, and it would seem of Europe generally, are true C. livia.

Here, again, we have three closely allied species, analogous to the three yellowfooted Hurrials, Treron viridifrons, Tr. phanicoptera, and Tr. chlorigaster; and if they are to be regarded as mere varieties of the same, what limits can be assigned to the further variation of wild species ? Col. leuconota is but a step more removed, and I doubt not would equally merge and blend with the others in a state of domesticity. Equally allied are-Treron sphenura and Tr. cantillans; Tr. apicauda and Tr. oxyura; and if we grant also some variation of size, we have Tr. bicincta and Tr. vernans; Tr. malabarica and Tr. chloroptera; Turtur chinensis and T. suratensis; T. meena and T. auritus; &c. &c., which might be regarded as local varieties of the same, and we might thus go on reducing species ad infinitum, with no useful definite result, but to the utter confusion of all discriminative classification. However closely races may resemble, if they present absolute and constant differences, whether of size, proportions, or colouring, and if they manifest no tendency to grade from one to the other, except in cases of obvious intermixture, we are justified in considering them as distinct and scparate; and more especially, if each, or either, has a wide range of geographic distribution, without exhibiting any climatal or local variation.

+ Rude Hindoo temple.



mynah and (rose-ringed) parroquet, they multiply to a vast extent; and the more so, as being held in religious veneration by some, and in special favour by all natives, their destruction is prevented wherever there They are so devoid of timidity, that even in the exists the power. midst of crowded cities, they will build on the cornices in the open verandahs of inhabited houses. When this takes place in the dwelling of a native, their tenure is secure; as their making such selection is looked upon as a happy omen, and their dismission as the sure forerunner of evil fortune. Pairs frequently take up their quarters among the domestic pigeons of the dove-cot; indeed, it is not an easy matter to prevent their doing so, and intermingling the breed. In the cold weather, they flock and frequent the paddy-stubble in large numbers."\* Capt: Hutton informs me that this bird "is found in Affghanistan, where, as in many parts of India, it builds in wells and ruined buildings: the kazeezes, or Artesian wells of Affghanistan, are sometimes crowded with them. They occur also in the Doon, and are known as the common blue pigeon. At Mussoorie, I have only seen them in the cultivated fields, low down on the sides of hills, in warm situations."

Being the original stock of the domestic pigeons of India, some notice of the latter should here be introduced. I have not, however, paid much attention to the several varieties; the more choice of which are, besides, kept chiefly by the Moguls in the Upper Provinces, and it is there that observations should be recorded of them. A chapter is devoted to the rearing of pigeons in the Ayeen Akbaree, and a number of breeds or races enumerated; but nothing definite can be understood of their distinguishing characters. The different kinds are chiefly esteemed for performing sundry aerial evolutions, and returning at once from any height at an accustomed signal. But to quote the work cited :- " There are also many other beautiful pigeons, which, although they neither wheel nor tumble in the air, yet perform many pleasing tricks; amongst these are the following,-The Kowkh, which seems to say the words yak-roo. The Luckeh [fantail], whose cooing is very agreeable, and he carries his head with astonishing pride and stateliness. The Lowtun, who upon being shaken, and then put upon the ground, jumps about with strange convulsive motions." (This may be seen at any of the Calcutta bird-dealers; shaken two or three times in the hand, and the head more

<sup>\* &</sup>quot; India Sporting Review," No. 1V, 121.

especially, the poor bird tumbles about in a fit for some seconds, when the owner recovers it by blowing hard in its face. They are chiefly black and white, and bare-legged, with a crested occiput; but present no other marked distinction.) " The Kehrnee, who has such amazing affection for his hen, that when he has flown out of [human] sight, if she is exposed in a cage, he instantly drops down upon it: they descend either with both wings spread, or with one open, or else with both shut. The Ruhteh, is a pigeon famous for carrying letters: but any pigeon may be taught to do this. The Neshwaree ascends in the air till he is out of sight, and remains so [i. e. absent?] for a day or two, after which he alights on the ground. There are also many other kinds that are valuable only on account of their beauty, such as the Sherazee,\* the Shushtree, the Shashenu, the Jougeeah, the Rezehdehn, the Muggessee, the Komeree, and the Gowlah: the last [or intermedia in its natural state] is a wild pigeon, of which, if a few are taken, they are speedily joined by a thousand others of their kind. There are people who obtain a livelihood by sending these pigeons to feed abroad, and making them vomit up the grain, by giving them water strongly impregnated with salt. A pigeon is said to live to the age of thirty years." \*\*\* Among the kinds commonly bred about Calcutta, are fine Powters (Gulla-p'hoola+), both feather-legged and bare-legged; Fantails (Luckah) of indisputable merit, but poor helpless monstrosities, except in the eyes of connoisseurs, some of which have at least thirty-six tailfeatherst; and races with an occipital top-knot (Nuns), are common: but I have seen nothing like the variety commonly bred by English fanciers, and the races generally are less pure (at least in Lower Bengal), with their peculiarities not so strongly brought out; unless in the instance of the fantails, and sometimes powters, which are as preposterous caricatures of the wild race, as the most extravagant admirer of Nature's freaks of the kind could reasonably desire, and as undeniably curious in shewing what domestication can produce.

C. LEUCONOTA, Vigors, Proc. Zool. Soc. 1831, p. 22; Gould's 'Century,' pl. LIX. (Hooded Rock Pigeon.) Size and form of last, the wings a

<sup>\*</sup> Sarajoo, Beng. A large black pigeon, with white rump, quills, and under-parts from the throat; generally, very true to this colouring.

<sup>+ &#</sup>x27;Swollen throat,' or, literally, full gullet (gula.)

<sup>#</sup> While drawing up this notice, I visited the bird bazar, and counted thirty-four feathers in a tail which was obviously imperfect.

trifle longer: cap, comprising the throat and ear-coverts, ashy-black: neck, rump (as in C. livia), and the entire under-parts, white, with a faint shade of ashy, except on the rump, deepest on the lower tail-coverts: interscapularies, scapularies, and wings, light brownish-grey, purer pale ashy on the medial coverts of the wings; the primaries dull-blackish towards their tips, the secondaries broadly tipped with dusky, and the tertiaries and their coverts having a subterminal dusky band, and broad greyish tips, producing a series of three short bars, successively smaller to the front, and a trace of a small fourth band anteriorly: tail and its upper coverts ashy-black, the former having a broad greyish-white bar, occupying the third quarter from the base of its middle feathers, and narrowing and curving forward to reach the tip of its outermost feathers. Bill, black: legs, pinkish-red: and irides, yellow. Common on the rocky heights of the Himalaya, inhabiting near the snow line.

According to Capt. Hutton, there are two races, if not species, confounded under C. leuconota; viz:—the true leuconota, as figured by Gould, with the white of the hind-neck spreading a considerable way down the back, and which (he informs me) is found only "far in the mountains;" and another, of which the description wholly corresponds with the Nepal and Darjeeling specimens which have served for the above description, and which Capt. Hutton states—"inhabits the Doon all the year, but is there called 'Hill Pigeon,' while the other is known to collectors as the 'Snow Pigeon.' The Doon bird flies in small flocks during summer from the hills to the Doon in the morning, and returns to the hills in the evening." If there be really any difference, however, between the birds adverted to, I suspect it must be merely one of age.

Subgenus Palumbus, Kaup. Wood Pigeons or Cushars. These have feet well adapted for perching, and a shorter tarse than in the preceding section, which also is more feathered towards the knee. They nidificate and habitually perch on trees.\*

C. PALUMBUS, Lin. (EUROPEAN WOOD PIGEON.) Upper-parts brownishgrey, the head, cheeks, throat, rump, and upper tail-coverts, pure ashy, paler on the lower tail-coverts; fore-neck and breast vinaceous-ruddy, weaker on the belly, and albescent towards the yent: nape, and sides of

<sup>\*</sup> It should be remarked, that the European C. anas is completely intermediate to these two groups, in its form, colouring, habits, and nidification; it breeding sometimes in the cavities of trees, sometimes in rabbit-burrows.

the neck and shoulders, glossed with changeable green and reddish-purple, the former predominating above, the latter below; and upon each side of the neck a great patch of subdued white, in general largely developed, very rarely reduced to a mere trace: coverts forming the edge of the wing, and impending the winglet, white, as is also the exterior margin of each primary: tail grey at base, becoming blackish at its tip. Bill orange, with a white mealiness at the tumid base of its upper mandible: feet red: and irides light yellow. Length, seventeen by thirty inches; and wing nine inches and a half.

This well known European species inhabits the north-western Himalaya, as about Simla, and in the Alpine Punjab.

C. (?) ELPHINSTONII: Ptilinopus Elphinstonii, Sykes, Proc. Zool. Soc. 1832, p. 149: a Carpophaga, apud G. R. Gray. (Neilgherry Wood Pigeon.) "Upper-parts fuscous-brown; the head, neck, and lower-parts, ashy; nape black, the feathers marked with a white spot at tip; interscapularies ruddy; neck and breast glossed with emerald-green, the rump with ashy; 1st, 2nd, 3rd, 4th, and 5th primaries, having their outer web emarginated. Irides ochre-yellow." Length, fifteen or sixteen inches.

I have had no opportunity of examining this fine species, but from the above description of its plumage, translated from Colonel Sykes's brief Latin definition, I cannot help doubting exceedingly the propriety of arranging it as a Carpophaga, and as strongly suspect that the present is its true systematic station. Colonel Sykes describes it to be "a rare bird in the Dukhun, met with only in the dense woods of the ghauts. Not gregarious. Stony fruit found in the stomach. Sexes alike. Flight very rapid. The lateral skin of its toes is very much developed." Mr. Jerdon has only noticed it "in the dense woods on the summit of the Neilgherries, in smell parties, or single. It is a retired and wary bird. I found various fruits," he adds, "and small shells, in its stomach."

C. PULCHRICOLLIS, Hodgson, (mentioned in Mr. G. R. Gray's catalogue of the specimens of Columbidæ in the British Museum). (Ashy Wood Pigeon.) Considerably smaller than the two preceding species; and general colour dusky-grey, much paler and faintly tinged with lake below, more or less whitish towards the vent, and subdued white on the lower tail-coverts: tail blackish: head, cheeks, and ear-coverts, pure light ashy, passing to whitish on the throat: the sides of the neck and breast,



brightly glossed with the usual changeable green and reddish-purple, the former predominating; and above this the feathers are somewhat rigid, and black at base, with broad isabelline tips, whitish at the end, forming a large patch on each side confluent behind. Corneous portion of the bill, apparently pale yellow: and legs probably pink, but fading to amber in the dry specimen, of which colour are also the claws. Length of wing eight and a half to nine inches. Common in the wooded region of the eastern Himalaya.

C. Punicea, Tickell, Journ. As. Soc. XI, 462.\* (Pompadour Wood Pigeon.) General colour deep vinaceous-ruddy, weaker below, and most of the feathers margined with glossy changeable green and amethystine-purple, the former colour prevailing on the neck and sides of the breast, the latter elsewhere: whole top of the head, including the occiput, whitish-grey: alars and caudals blackish; the primaries tinged externally with grey: upper and lower tail-coverts nigrescent: bill yellow at tip, its basal half blackish in the dry specimen: "irides, orange with a red outer circle: feet dull lake." Length, about sixteen inches; of wing eight inches; and tail, seven inches.

This handsome pigeon inhabits the hill forests of Central India, also those of Assam, and would appear to be tolerably common in the Island of Ramree, Arracan. I have never seen it from the Himalaya.

C. Hodgson, Vigors, Proc. Zool. Soc. 1832, p. 16: C. nipalensis, Hodgson, Journ. As. Soc. V, 122.† (Speckled Wood Pigeon.) Above, dark vinaceous-ruddy, with white specks on the medial coverts of the wing: head and upper-part of front of neck cinereous, with a vinous tinge in some specimens: rump, upper and lower tail-coverts, dusky-ash: tail ashy-black; the great alars brownish-dusky, the first three primaries having a slight whitish outer margin in some specimens; and the exterior wing-coverts are greyish: nape, sides of neck, and lower parts, vinaceous-ruddy at base of feathers, margined (more broadly on the side of each feather of the breast) with vinous-grey, which increases in quantity upwards, till the surface of the plumage appears solely of this hue; while the dark vinous tint predominates more and more towards the belly; the red portion of each feather appears thus as an obtusely pointed spot upon those of the breast, and on the feathers of the neck

<sup>\*</sup> Type of Alsocomus, Tickell.

<sup>†</sup> Type of Dendrotreron, Hodgson.

is darker and acutely pointed, being there uniformly edged with the pale ashy margin. Bare orbital space livid: bill, purplish-black: "irides hoary, or grey-white: legs and feet black-green to the front, yellowish elsewhere; claws clear lively yellow." Length, about fifteen inches, by twenty-five or twenty-six inches in alar expanse; wing nine inches to nine and a quarter. "Female," according to Mr. Hodgson, "rather less, and differing in having the bluish-grey of the head less pale and clear, and in wanting almost entirely the purplish tinge which adds so much beauty to certain parts of the plumage of the male, as especially the upper part of his back, and the lower part of his belly."

"This elegant species," continues Mr. Hodgson, "is found in the woods of the valley of Nepal. It is very shy, seldom or never entering the cultivated fields for the purpose of feeding, but keeping almost always to the woods, and living upon their produce, in the shape of grass, seeds, or berries." It would seem to be not uncommon near Darjeeling: and Captain Wroughton informs me, that it is also tolerably numerous about Simla and Mussooree, where it frequents the pine forests on the higher mountains, as Whartoo and the vicinity of Kotghur. They are generally seen in flocks of six or seven, which are particularly shy and difficult of approach.

C. Hodgsonii is nearly allied to C. arquatrix of Southern Africa; but is at once distinguished from that bird by its blackish bill, by the grey upon its head and neck, and by the reduced development of the nude space surrounding the orbits. Another allied African species, is the C. guinea, Lin. (v. triganigera of Wagler).

#### The DOVES-

Are generally smaller and more delicately formed, with the tail commonly more or less lengthened and graduated, this latter character attaining a high degree of development in certain groups of them. The nearest approach to the wood pigeons is exhibited by the North American passenger doves (*Ectopistes*, Sw.), which are especially characterized by having a long, much graduated, and sharp-pointed tail, and powerful wings, of which the first two primaries are equal and longest; they have the true pigeon-like play of colours on the sides of the neck. The African *Ena capensis* has been generally placed near *Ectopistes*, but (so far as can be judged from drawings,) would appear rather to approx-

imate certain of the Macropygiæ of the Eastern Archipelago, as M. Reinwardtii. To the last named group, one Indian species appertains.

MACROPYGIA, Swainson: Coccyzura, Hodgson. (Cuckoo-doves.)

The species of this division are remarkable for their very broad, long, and much graduated, tail, and general Cuckoo-like figure. They chiefly inhabit the great Eastern Archipelago, a single species occurring in the Himalaya, and another in Australia. For the most part, they are confined to rocky upland forests, and subsist much on berries, often descending to the ground to pick up fallen mast and fruits: upon being disturbed, their great broad tail shews to much advantage, as they rise. The species of the Archipelago are very injurious to the pepper and other spice plantations; and their flesh is highly esteemed for the table, from the fine flavour said to be imparted to it by the various aromatic berries on which they feed.

M. LEPTOGRAMMICA. Col. leptogrammica, Temminck, pl. col. 248: Coccizura tusalia, Hodgson, Journ. As. Soc. XIII, p. 936. (RAYED CUCKOO-DOVE.) Upper-parts dusky, with numerous narrow rufous bars on the mantle, wings, rump, and upper tail-coverts; tail more obscurely barred in the male: forehead, chin, and throat, whitish, tinged with lake: the occiput, neck, and breast, dull pale vinaceous, glossed (less brightly on the breast) with changeable green and amethystine-purple: lower-parts yellowish-albescent, the under tail-coverts pale buff; all but the four middle tail-feathers ashy, with a broad black subterminal band; and above this band, the exterior web of the outermost tail-feather is whitish. Female having the tail barred with narrow rufous cross-lines, like the rest of the upper-parts; and the fore-neck and breast are similarly rayed with alternate dusky and pale buff. The tail-feathers, more especially of the female, have their inner webs rufous at base. Bill-black : cere, orbits, and legs, red. Wings seven and a half to eight inches; middle tailfeathers the same, the outermost four inches and a half.

The above descriptions are taken from a fine characteristic male and female: considerable variation of plumage occurring, as many specimens are in different degrees intermediate. This bird inhabits the eastern Himalaya, and is common at Darjeeling.

TURTUR, Selby. (THE TURTLE-DOVES.) (G'hoogoo, Bengal; Fachtah, H.; Gya, Arracan.)

Small and delicately formed tree-pigeons, with the tail moderately graduated, or merely rounded, having always broad grey, or grevishwhite, tips to its graduating outer-feathers; neck devoid of iridescent gloss. They feed chiefly on the ground, upon grain, small pulse, and oil-seeds; assemble in small flocks except when breeding, and generally prefer groves and coppices which intersperse the open country, coming much into gardens, where sometimes they may be seen nearly as familiar as domestic pigeons. . In such situations they breed abundantly, constructing the slight platform nests common to all arboreal Columbidæ; and in warm climates, they have no special season for propagation, but produce alike at all times of the year, the same as domestic pigeons. As compared with the large true wood pigeons, these birds are certainly much more terrene in their habits\*; but they grade towards the wood pigeons in Turtur picturatus (V. Dufresnii) of the Isle of France, which, however, is a true turtle-dove, having merely a larger bill than its congeners. Their geographical range is confined to the Old World, inclusive of Australia; and the only Australian species (T. humeralis) is coloured like the Geopeliæ; which last are indeed but a sub-genus of the present group, consisting of smaller and more slender-formed species, with delicate rayed plumage, and which are confined in their distribution to the Malay countries and Australia.+

T. RISORIUS: Col. risoria, Lin. (Kālhāk, Kāhālāk, Kahalaki, or Pánr G'hoogo, Beng.; Dhor Fachtah, S. India.) (Grey turtle-dove.) Uniform light grey-brown; the edge of the wing, and lower tail-coverts, pure ashy, somewhat deeper on the latter; head delicate pale vinous-grey, whiter on the forehead and throat; the nape and under-parts less ashy, and more vinaceous, passing to light greyish towards the vent; a narrow black half-collar on the hind-neck; primaries dusky, with slight whitish margins bordering their tips; and closed tail uniform with the back

They resemble the generality of more dove-like Gourine (as do also the Rock Pigeons), in having the outer toe shorter than the inner; which, accordingly, would indicate a terrene propensity.

<sup>†</sup> G. striata (v. Col. sinica, malaccensis, bantamensis, &c.), common in the Malay countries, appears also to inhabit the Mauritius. Living specimens are occasionally brought to Calcutta, where I have kept both it and T. humeralis; and being thus familiar with both, I do not agree with Messrs. Gould and G. R. Gray in making a Geopelia of the latter. It serves, however, to show the immediate connexion of the two sub-groups.

above, all but its middle feathers successively more distinctly marked with black about the middle, passing into greyish on the basal half, and to white on the terminal, successively more strongly pronounced. Irides crimson; bare orbital skin white; the bill black; and feet dark pinkish-red. Length thirteen inches by twenty or a trifle less; wing six inches and a half, or sometimes rather more.

Common and generally diffused, frequenting hedges and trees in the neighbourhood of cultivation, and even low bush-jungle: it inclines more to be gregarious than the other species. To the eastward, however, it seems to be unknown in Arracan. According to Mr. Strickland, the identical species occurs in Northern Africa; and it is likewise stated to inhabit the south-eastern part of Europe, as Hungary, Turkey, and the Islands of the Lower Danube.\* In Southern Africa, it is replaced by a nearly allied species, the Col. vinacea, Gmelin, to which Mr. G. R. Gray refers T. erythrophrys of Swainson; while Mr. Strickland identifies the latter with T. risorius, and considers T. semitorquatus of Swainson to be the vinacea."+ Mr. Gray, again, does not mention semitorquatus of Swainson, but gives semitorquatus, Rüppell, as distinct from either. T. vinaceus is distinguished from T. risorius, by its generally much darker colour, by having the under tail-coverts whitish instead of deep ash, by its much broader black nuchal semi-collar, and by its winglet and primary-coverts being dusky instead of pale ash-grey. It is also rather smaller than the Indian species; in which respect; and in the breadth of the nuchal half-collar, the common tame cream-coloured (or pale buff-backed) doves, which are abundantly bred in captivity both in Europe and in India, agree with the South African, rather than with the wild Indian species. As for Swainson's two alleged species, I can identify neither of them satisfactorily; his figure of T. erythrophrys, is evidently faulty in the colouring; but he speaks of "the belly, flanks, vent, and under tail-coverts, as "clear cinereous," which should distinguish it from T. vinaceus, while its "broad black semi-collar, margined by a narrow cinereous line," instead of a slight greyish-white one, should equally

<sup>•</sup> Bull. de l'Acad. des Sciences de Saint-Petersburgh, 1837, No. 46; as quoted in the Rev. Zool. par la Société Cuvierienne, 1838, p. 293.

<sup>†</sup> Vide Strickland, in An. & Mag. N. H. 1844, p. 38; Gray's illustrated 'Genera of Birds'; and Swainson's 'Birds of West Africa,' Vol. 11., Nat. Libr.

separate it from T. risorius; again, "the orbits are naked and rich red," which applies to neither of them; his T. erythrophrys has the wing seven inches, and his T. semitorquatus only five inches and a half; both the Indian and South African species being in this respect intermediate. T. semitorquatus has, further, "the belly, vent, thighs, and under tail-coverts, cinereous-white," which agrees sufficiently with some specimens, apparently females, of T. vinaceus, the (presumed) males, having at least the abdomen scarcely paler than the breast; but "above all, the inner toe is one-twentieth of an inch longer than the outer," whilst "in erythrophrys, this proportion is almost reversed, or at least the inner toe is not even equal to the outer." In both the Indian and South African birds, the inner toe is shorter than the outer.

Besides the common cream-coloured domestic race, a small albino variety is frequently bred in cages, in different parts of India, with wing measuring five and a half to six inches; but its form of tail and other proportions are as in *T. risorius* and *T. vinaceus*. This bird is often interbred with the cream-coloured race, producing offspring of intermediate size, and shade of colouring.\* The coo of *T. risorius* somewhat resembles the sound cuckoo, pronounced slowly, and with a pause between the syllables, the second being much prolonged and at first rolled. It may not unfrequently be heard in moonlight nights.

T. HUMILIS: Col. humilis, Temminck: Asiatic Pigeon, Latham. (Serotee Fachtah, Hind.; Golabee—or rose-coloured—G'hoogoo, Támá-khūree—or copper-cup,—and I'tkūiyá—or brick-coloured—dove, Beng.; Goodko—G'hoogoo? i. e. dove,—Scinde; Gyo-leng-bya, Arracan.) (Red Turte-dove.) Much smaller and of a less elongated form than the last; and general colour fine vinous-red, weaker below; the head ash-grey, paler towards the forehead, and whitish on the chin; a black half-collar on the pape; the rump and upper tail-coverts dusky-ash; vent and lower tail-coverts white, the former tinged with ashy; middle tail-feathers cash-brown; the rest successively more broadly tipped with white, which spreads up the whole exterior web of the outermost feather, and their basal two-thirds (more or less) blackish; margin of the wing grey for the anterior half; the primaries and

The "Jungle Pigeon" of Latham would seem to be merely a domestic variety of this kind.

Drofts for a Fauna Indica. 873 their coverts dusky, and the secondaries greyish-dusky. Irides dark brown; bill black; and legs purplish-red. Length nine inches and a half; and of wing five and a quarter. Female rather smaller. The young nearly resemble the adults of T. risorius, except in their much smaller size, their general darker colour, especially upon the head, and

by Major Franklin. The Red Turtle-dove is generally diffused over the country, though much less numerously than the grey one. It also keeps more to cover, frequenting groves and high thick hedges. Its coo is short and

in wholly wanting the vinaceous tinge: in this state of plumage, they doubtless constitute the supposed small race of T. risorius, mentioned

grunt-like.

T. SENEGALENSIS: Col. senegalensis, Lin.: C. cambaiensis, Gmelin, C. ægyptiaca, Latham; C. maculicollis, Wagler :- figured, but not well, and much over-coloured, in Denon's Egypt. (Tortroo Fachtah, Hind.) (NECKLACED TURTLE-DOVE.) Brown above, the wing-coverts (except towards the scapularies) pure light grey; winglet, primaries and their coverts, dusky, the secondaries tinged with grey; head, upper-part of neck, and breast, pinkish-vinaceous, paling below, and passing to white on the belly and lower tail-coverts; the sides of the neck anteriorly (and meeting imperfectly in front,) adorned with a large patch of furcate feathers, black at base, with a round rufous spot on each tip : in the living bird, these hardly appear at all when the neck is drawn in; and unlike the preceding species, there is no bar or other marking on the nape: tail graduated to the depth of an inch, and its feathers attenuate a little towards their tips; the middle tail-feathers are brown; the rest white for the terminal half or nearly so, and black for the remainder. Irides dark with a white inner circle; bill blackish; and legs lake-red. Length ten inches or ten and a half, by fourteen inches; closed wing five inches.

This delicate little species abounds in most parts of the peninsula, also in Western and Upper India generally, and it inhabits the Rajmehal and Monghyr hills in Bengal; but in Lower Bengal, I have never seen or heard of it wild, nor does it appear to occur in the Himalaya, or in the countries to the eastward. In the peninsula, according to Mr. Jerdon, "it abounds both in low jungles, and near villages and cantonments, being found especially towards the north in every garden,



and frequenting stable-yards, houses, &c." Like T. risorius, it is common to India and North Africa; and Mr. Strickland states, that it "inhabits the Turkish burial-grounds at Smyrna and Constantinople, which are dense forests of cypress-trees. It is strictly protected by the Turks, and it was with some difficulty," he adds, "that I could obtain a specimen. It was perhaps originally introduced there by man; but now seems completely naturalized."\* The coo of this species is low, subdued and musical, a dissyllabic sound repeated four or five times successively, and of which its Hindoostance name Tortroo is a sort of imitation.

T. Suratensis: Col. suratensis, Gmelin, founded on la Tourterelle de Surate of Sonnerat : C. tigrina, Temminck : C. turtur, Lin., var., figured in Griffith's 'Animal Kingdom,' vIII. 290. (Chitroka Fachtah, Hind, ; Chanral G'hoogoo, or Telia G'hoogoo, Beng. ; Kangskiri, Bhagulpore; Chitla, Upper Provinces; Lay-byouk, Arracan.) (Speckled TURTLE-DOVE.) Above blackish or dasky; each feather having two pale rufous terminal spots, which latter enlarge, and spread up each side of the feather, upon the wing-coverts, the blackish contracting to a central streak, with broad pale vinaceous lateral borders; edge of the wing light grey; head greyish, tinged with vinaceous, which latter prevails on the breast and under-parts, passing to white on the belly and under tail-coverts; a broad half-collar on the nape, consisting of black feathers divergent at the tips, each tip ending in a small round white spot: tail broad and graduated to the depth of an inch and a half or more, each feather attenuating towards its tip; the middle tailfeather brown, the outermost greyish-white for nearly the terminal half, having the rest black, and the other tail-feathers successively intermediate in their colouring. Irides dark hazel, surrounded by a reddish schlerotica; beak dull leaden-black; and legs dark purplish-red. Length twelve inches by sixteen and a half; of wing five inches and threequarters: female rather less.

A very familiar species, and generally diffused, both throughout India and in the Malay countries; coming very much into gardens, even of large towns. It abounds even more than T. risorius, in the vicinity of Cal-

<sup>\*</sup> Proc. Zool. Soc. 1836, p. 100.

cutta, where it inhabits every patch of garden; T. risorius keeping generally a little away from houses. Its coo is musical and pleasing. Mr. Jerdon mentions having "seen a nearly albino variety once or twice, of a pinkish-white colour throughout." This species has been erroneously identified with the T. chinensis (Col. chinensis, Scopoli, vel C. risoria, var. B, Latham), founded on la Touterelle grise de la Chine of Sonnerat, by whom it is correctly figured. The latter is distinguished by its larger size, having the wing and tail respectively six inches long; by the deep ash-colour, instead of white, of its lower tail-coverts; and especially by having the back and wings plain unspotted dark brown, with merely a slight tinge of grey at the bend of the wing only; the spotting of the nape is precisely similar. This bird inhabits China, and the Society possess a specimen of it from Chusan.

T. MEENA: Col. meena, Sykes, Proc. Zool. Soc. 1830, p. 149: C. agricola, Tickell, Journ. As. Soc. II, 581; very closely allied to, if not identical with, C. orientalis, Lath., founded on la Tourterelle brune de la Chine of Sonnerat, which is certainly also C. gelastis, Temminck, pl. col. 550. (Kullah Fachtah, Hind.; Sam G'hoogoo, Beng.; H'hulgah, of the Mahrattas; Gyo-pein-doo-ma, Arracan.) (Fox-coloured Turtle-DOVE). Vinaceous-brown, lighter on the belly; more or less ruddy, ashy, or even duskyish, above; the rump and upper tail-coverts deep grey; vent and lower tail-coverts lighter grey; crown and forehead more or less ashy, passing to whitish towards the bill; throat also whitish in some specimens; on the sides of the neck a patch of black feathers, margined with greyish-white, forming a series of three or four lines of the latter hue; scapularies, and a greater or less proportion of the wingcoverts, black, broadly margined with rufous all round their tips; coverts of the secondaries pale bluish-ash, at least in some specimens; winglet, and primaries with their coverts, dusky, the primaries slightly edged with whitish; tail dusky-ash, its outer feathers successively more broadly tipped with whitish-ash, whiter on the outermost and beneath; irides orange. Length about eleven inches and a half; of wing commonly seven inches.

This bird is also pretty generally diffused throughout India, and occurs upon the Himalaya as a summer visitant, arriving in pairs towards the end of March, as I am informed by Capt. Hutton. Mr. Jerdon

observed it to be tolerably abundant in the forests of Goomsoor, south of Cuttack, associating in flocks of various sizes. It is enumerated by Mr. Elliot, he adds, as found in the Southern Mahratta country; but was not observed by himself in the forest of Malabar. In the Himalaya, and in the eastern countries of Assam, Sylhet, and Arracan, it appears to be plentiful, inhabiting alike the hills and plains; and it is common in the Bengal Soonderbuns. A Javanese specimen is rather large, and very dull-coloured; less vinaceous underneath, with more grey on the head, and less rufous margining the feathers of its mantle, than in any Indian specimen I have seen; nevertheless, the species is probably identical.\* It is nearly allied to T. auritus, Ray (Col. turtur, Lin.), of Europe, which it resembles in its manners, and in its coo: but is distinguished by its superior size; "orange irides instead of yellow; by the whole head (in some), neck, shoulders, breast and belly. being richer vinaceous; in the back and rump being ash, and vent and lower tail-coverts light cinereous," &c. The specimens of T. auritus from India and China, mentioned by Latham, may accordingly be presumed to have been of the present species. Another nearly allied dove would seem to exist in la Tourterelle cendrée de l'Isle de Luçon of Sonnerat, upon which are founded Col. cinerea, Scopoli, and C. turtur, var. C, of Latham. Living specimens of the present species, and of the Grey, Red, and Speckled, Turtle-doves, also of the Ground Dove, and of Treron phanicoptera and Tr. bicincta, are almost always to be seen for sale at the shops of the Calcutta bird-dealers.

Memorandum.—The only known Indian Pigeons now wanting to the Museum of the Asiatic Society, Calcutta, are Columba Elphinstonii, and Himalayan specimens of C. palumbus; also females of Treron cantillans, and of Carpophaga insignis; and good specimens of Col. leuconota are acceptable, as also of C. pulchricollis. Of species that require verification, there remain the Treron pompadora of Ceylon, and Psammanas Burnesii of the Western Deserts (?). Also Col. malabarica, Lath. (Colombe brame of Temminck), founded on la Tourterelle de la côte de Malabar of Sonnerat. Size of Turtur risorius; head, back, and wing, pale ashgrey; the neck and breast weak vinous-grey; belly white; some oval

This Javanese bird is certainly T. orientalis, (Lath.), and gelastis, (Tem.); the former of which names, holds precedence for the species.



black spots on the greater wing-coverts. Tail marked with white as in the other Turtle-doves. Bill, irides, and feet, red. Whether the Indian Carpophagæ ever lay more than a single egg in each nest, is also a subject for investigation.

April 4th, 1846. .\*

E. B.

Postscarpt.—Some notes on the Indian Columbidæ, with which I have been obligingly favoured by Capt. Tickell, arrived too late to be incorporated in the foregoing paper, but may nevertheless be advantageously appended to it.

"Treron phonicoptera. These birds are very common throughout the high stony barren parts of Singbhoom, and in the Mauthhoom district, confining themselves to the hurgoolur and peepul trees. They breed in the thick damp forests to the southward, towards Sumbulpoor, during the rains; at which time not a single specimen is to be found in these parts. The Oorias sell numbers of the young ones, which are taken to Calcutta.

"Tr. bicincta. I killed a specimen of this bird, some years ago, in Singbhoom, when firing into a flock of the Common Hurrial: and I have more than once remarked, in a flock of the latter, smaller individuals, which I have no doubt were interlopers of this species. It is exceedingly rare here, for I have never obtained another specimen.

"Tr. sphenurus. This bird, the Kookoo fo of the Lepchas at Darjeeling, is there exceedingly common, but is not so extensively gregarious as the common Hurrial of the plains. They frequent the highest trees, feeding on their berries, and running along the branches with great agility. The male has a most agreeable note, exactly resembling the music of a pastoral reed or pipe. It breeds in June and July, making a large nest in high trees, deeper than that of the common Doves and Wood Pigeons. Bill, pale livid blue, nearly white at tip, and pale clear cobalt basally. The young resemble the female; and the ruddy tinge of the back and small wing-coverts of the male is not assumed until the second year.

"Carpophaga insignis. Of this fine species, I killed a female (one of a pair, the male of which escaped) at Kursiong, towards the end of the month of June. It is not common. The pair were perched on a small tree on the summit of the hill, feeding on berries, with which the crop of the female was filled. Voice, a deep short groan, repeated—'woo-woo-woo.' Length of this female seventeen inches, by twenty-seven inches in spread of wing; wing nine inches. Irides pearl-grey: bill, dull lake, with blackish tip; legs dull lake. Back, scapularies, and wing-coverts, full deep vinous ash-grey washed with cupreous, the latter pervading the tips and edges of the feathers.

"C. sylvatica. I have found these birds only in one part of my district, —in the jungles bordering on Midnapore. They were in a party of eight or ten, perching on detached trees, in a wide plain of jungle-grass. The notes are deep and ventriloquous.

<sup>#</sup> All that I have seen with the Calcutta dealers, were from the neighbourhood, and chiefly adults newly taken with bird-lime.

<sup>†</sup> I have observed this red to be less developed in some specimens; but still suspect that more or less of it would be obtained at the first moult,—E. B.



By the Oorias it is called Sona Kubootra [i. e. Golden Pigeon: it is also termed in some parts Burra (or great) Hurrial.]

"Chalcophaps indicus. Common in the deep forests, always in the vicinity of streams; and generally upon the ground, in the shelter of beds of reeds and rank grass. When flushed, it takes a short but exceedingly rapid flight, alighting as abruptly with a sudden plunge into the herbage; so that it is a most difficult bird to shoot. Its favourite food consists of the seeds of the castor-oil plant.

Columba intermedia. Exceedingly common in Chota Nagpore, breeding in all the steep lofty rocks of that country.

"C. punicea. Length sixteen inches, by two feet spread; wing eight inches and three-quarters. Bill greenish-yellow, with basal half livid. Iris amber-yellow, in an orange-red circle. Legs and feet dull lake. The female is similar to the male, but rather smaller and duller in plumage. This species is not uncommon to the south of Singbhoom, going in small parties of four or five, and always along the banks of rivers, which are shaded by large forest-trees. Up and down these noble avenues, which the green shades of mingling boughs above, and the clear rippling stream below, preserve at all hours and seasons pleasantly cool; these Pigeons fly, rarely taking, when disturbed, to the more open tracts distant from the stream. In January 1842, I killed five specimens on the Bytarnee river in Singbhoom. They were feeding principally on the jamoon. These birds feed chiefly in the morning and again at evening; and during the heat of the day, roost on the uppermost branches of the huge derris trees, common in that country. They are wary and difficult of approach."

The above excellent contribution from Capt. Tickell, exemplifies exactly what I hope to be favoured with by many other correspondents — E. B. May 22nd, 1846.

A FOURTEENTH MEMOIR on the Law of Storms in India; being the Bay of Bengal, Ceylon, Malabar Coast, and Arabian Sea Storms of 29th November to 5th December, 1845. By Henry Piddington, President of Marine Courts of Enquiry.

The Storms which are the subjects of this Memoir; are of very considerable interest, for taking their rise so near to the Equator as 7° North latitude, they travel up on the usual WN. Westerly track, crossing the Island of Ceylon, the Southern extremity of India and the Laccadive Archipelago, are finally lost for us, in the Arabian Sea, the last notice we have of them being that of the ship *Monarch*, which met hers in latitude 13½° North, longitude 69° East.

This is the second instance of storms, which have been traced on the North side of the Equator, originating in so low a latitude, the first being



the Fyzulbarry's, detailed in my Eleventh Memoir, which had a track to the NNW., while these of our present Memoir have very distinctly one to the WNW. It will be remarked, that these storms appear to take their rise in about the same latitude North, as those in the Storm tract, to which I have elsewhere\* alluded, do on the South side of the Equator, and about on the same meridian, but our information is, as yet, too scanty to allow us to draw any inference from this coincidence. A matter of more present importance, is, that it is a track which lies much in the way of our Steamers. It is partly on this account, and partly that I was desirous of recognising by early publication, the kind, efforts of the Bombay Chamber of Commerce, which has transmitted to me, through the zealous labours of its Secretary, Mr. Scott, the documents from the West of Cape Comorin: while to Capt. Biden I as usual owe most of those on the East, that I have deferred other labours in hand to investigate it. I must not forget to acknowledge here also the attention of Capt. Twynham, Agent for the Peninsular and Oriental Steam Navigation Company; Capt. Moresby of their Steamer, the Hindoostan; Major General Cullen, Resident at Cochin; and Mr. Higgs, Master Attendant of H. M's. Naval Yard, Trincomallee, for their careful forwarding of all the information they could collect. We have also another novelty in this storm, which is, that of a fine, well appointed Steamer, (the Peninsular and Oriental Navigation Company's Steamer Hindoostan,) steaming through the Western verge of the Vortex, ! and passing the calm centre with all the changes of the wind, which she should have, and with the hurricane so violent as to blow away her boats, &c. I am much indebted to Capt. Moresby for his log observations and barometrical notes, which are of very great interest; for in the execution of his duty, he has also, like Capt. Finck of the Charles Heddle, performed a very valuable experiment for our new Science.

I have as usual given the authorities as closely abridged as possible, and finally omitting, for brevity's sake, the comparative table, the various considerations from which the track of the storm has been laid down. The documents begin with the log of the ship Caledonia, which had the storm farthest to the Eastward.

<sup>#</sup> Horn Book of Storms, p. 7, 2nd Edition.



## Ship CALEDONIA, Captain BURN.

I have fortunately two abstracts of this ship's Log: fortunately, because in the one there is evidently some grave oversight as to the ship's place, which on the 29th, is made 49', and on the 30th, when she was becalmed at the centre of the hurricane, 68' miles! to the Eastward of the one now printed; which being in Capt. Burn's hand writing, I take to be the correct one. It has also the advantage of having the barometrical observations.

Extract from Ship Caledonia's Log Book; Bay of Bengal. Reduced to civil time. Forwarded by the Chamber of Commerce, Bombay.

Saturday, 29th November, 1845.—Throughout a moderate breeze, from Southward and SE. with passing squalls, and constant rain. Latitude by account 6° 50′ North, longitude 88° 30′ East; barometer 29.70; ship under double-reefed top-sails, and reefed courses, as the weather looked threatening. The two previous days we had much rain, and vivid lightning from the Northward and NW., and a heavy swell the last day from SW.

From noon till midnight, a fresh breeze from South and SSE., with heavy rain at times, swell increasing. Barometer 29.70. Distance run from noon to midnight ninety miles. Course West.

30th Nov .- 1 A. M. Increasing breeze. Barometer 29.65.

- , 4 A. M. Heavy gale, wind shifting from South to SE. Barometer 29.50.
- South to SE., and back again; a very heavy swell from SW. Barometer 29.50.
- 7 A. M. Wind suddenly shifted to East, and increased to a very heavy gale, which obliged us to cut away the sails we had set, and lay the ship to, with her head to the Southward. Barometer 29.50.
- 8-30 A. M. Gale at its height. Barometer 29.50.
- ., 10 л. м. Gale decreasing, but found the barometer had fallen to 29.40.

30th Nov.-11 A. M. Suddenly fell calm.

- Noon. Light airs from SW + cloudy appearance all round. Barometer (still falling) 29.35, a very heavy swell. Latitude by account 7° 0' North, longitude by account 85° 50' East.
- From noon till 6 P. M. Light airs from the SW. and SSW., with cloudy weather and a heavy swell. Barometer gradually falling.
  - 6-30 P. M. Increasing breeze from the South. Barometer 29.25.
- 7-30 P. M. Gale returned with all its former violence, a very heavy swell from SW. Barometer 29.20.
- 10-30 P. M. Barometer commenced rising. Wind South.

1st Dec .- 1 A. M. Gale decreasing. Barometer 29.40.

- 4 A. M. Gale moderating fast, and swell going down, wind drawing round from South to SE. Barometer 29.45.
- 8 A. M. Fresh breeze, a SE. Barometer 29.60.
- Noon moderate, breeze ESE., with cloudy weather. No observation.

The following day we got observations, and found the longitude by account correct to a few miles, but the latitude by account was fifty miles to the Southward of observation, shewing we had experienced a strong set to the Northward.

John F. Bunn, Commander, Ship Caledonia. Bombay; 9th February, 1846.

Abridged Log of the Ship ALIBI, Captain Rhodus, from the Mauritius, bound to Vizagapatam. Log reduced to civil time.

On the 27th November .- The Alibi was at noon in latitude 3° 6' North, longitude 90° 34' East, with a five knot breeze from the South.

Throughout the 28th .- To noon on that day , when she was in latitude 6° 9' North, longitude 90° 57' East. She had strong steady South to SSE., winds, latterly the weather rather unsettled, but at noon she had a lower studding-sail set. r. M. the wind hauling gradually to the



Eastward, and at 6 r. m. it was due East to midnight. Ship running eight knots to the Northward.

29th November.—Wind EbN., and ship running to the North, seven and a half knots, to non; when latitude by observation 9° 8' North, longitude 91° 0' East, frequent squalls, and the weather very unsettled. Barometer at 29.45. P. M. hard squalls and sea rising. 6 P. M. wind ENE., at 9, South, and decreasing, but the squalls heavier. Ship always running seven and eight knots to the NNW.

30th.—Midnight and to noon, wind marked NE., increasing again with tremendous heavy squalls, and weather very threatening. At daylight more moderate, and at noon latitude 11° 50′ North, longitude 89° 32′ East. Barometer rising a little, and weather clear to the East, but dark and heavy to the Westward. P. M. and to noon on the 1st, strong NE. breezes.

It will be clearly seen on reference to the chart, that this ship ran up between the 28th and 29th to the Eastward of the Caledonia's Storm Circle, which was probably then forming.

Abridged Log of the Ship Juliana, Captain W. T. Woodhouse, from the Mauritius to Madras. Reduced to civil time. Forwarded by Capt. Biden.

The Juliana at noon on the 27th November, was in latitude 5° 9' North, longitude 87° 50' East, with fresh breezes N. Westerly, threatening weather and thick misty rain, with a high confused sea from ENE. P. M. to midnight, wind N. Westerly to West, with the same weather, and a broken swell from the NE. At 10, wind varying from NNW. to West. Heavy rain all night.

28th November.—Daylight wind had veered to SW., noon moderate with passing showers. Latitude 7° 12' North, longitude 89° 3' East. P. M. to midnight, gradually increasing to fresh gales; and rain and wind veering from SW. to SSE. at 8 P. M.; at 9 SE., at 10, East; at 12, ENE.

29th.—At 1 A. M. wind NEbE. At daylight "increasing gales." At 8 A. M. NNE. and increasing to noon, when strong gales NNE. and a heavy sea, latitude 8° 54' North, longitude 87° 28' E.\* At 11 A. M. hove to. P. M. to midnight, gale from NE. with some very heavy gusts, the strongest at 4 P. M. Sea very heavy.

<sup>\*</sup> Hawks, Petrels and other birds alighting, is noted in the log at noon this day.

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30th November.—2 A. M. wind ENE. 8 A. M. ESE. Noon latitude 9° 34' North, longitude 86° 5' East. P. M. moderating. 3 P. M. wind East, at 9 ENE. to midnight, when gale breaking to windward with dark appearance to the SW. and vivid lightning.

1st December.-Moderating. Noon latitude 10° 53' North, longitude 84° 53' East.

This Ship's barometer was deranged.

1845.]

Abridged Note from the Log of the Ship Frances, Captain Sharp, from England (?) to Madras. Reduced to civil time. Forwarded by Captain Biden.

30th November, 1845.—Strong gale with heavy squalls and a high head sea, ship under three double-reefed top-sails, and fore-topmast staysail. Wind from WNW. to SW., Latitude by account 7° 42' North, longitude by account 86° 9' East. P. M. a heavy gale, and a dangerous head sea from North-eastward. P. M. carried away the fore and maintopgallant masts.

1st December.—Strong breeze and cloudy, latitude by account 9° 13' North, longitude by account 85° 41' East. P. M. more moderate throughout, with rain.

2nd.—Latitude by observation 11° 39' North, longitude by observation 85° 50' 15" East.

Extract from the Log Book of the Ship Monley. Forwarded by Captain
BIDEN.

At noon 30th November, then in latitude 9° 50' North, longitude 87° 10' East, with brisk gales from SSW. The glass commenced to fall, a wild appearance, down royal-yards and all the gear. At 8 p. m. a sudden shift in a tremendous squall from East. At midnight, a severe storm attended with strong gusts, the sea making up in heaps, causing the ship to lurch heavily and endangering the masts. At 8 A. M. 1st December, a heavy storm, wind veering from NNE. to East with heavy rain, ship now lying to under close-reefed main-topsail. Noon a heavy



gale EbN. at midnight, the gale reered to ESE. and became more moderate. Glass down in the height of the gale to 28.90.

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The following Memorandum of the Morley's Barometer, was obtained and forwarded to me, by Captain Biden.

Morley's Barometer at commencement of gale,	29.85
Ditto midnight, 30th November,	29.30
Ditto ditto, 1st and 2d December, 3 A. M.	28.90
Soon after the strength of the gale, Barometer rose to	, 29.40
and suddenly to,	29.80

#### Ship MYARAM DYARAM.

Capt. Biden, notes in a letter, that the ship Myaram Dyaram, from Manilla to Bombay, put into Galle, having lost boats, cut away anchors, and thrown part of her cargo overboard, in a gale from the Eastward in 9° North and 86° East, and this appears, by a letter from Capt. Faucon of the Frolic, to the Secretary of the Bombay Chamber, to have occurred on the 1st December. This vessel is also noticed in a letter from Capt. Twynham, at Point de Galle, as having had the gale at the same time as the Caledonia, and five feet water in her hold.\* We are thus uncertain as to the date of the worst part of the storm with her. Capt. Faucon states it to have begun on the 28th; the two ships, the Caledonia and Myaram having left the Straits together.

Abridged Log of the Ship John Wickliffe, from London to Madras.

Reduced to civil time. Forwarded by Capt. Biden.

On the 29th November.—From noon to midnight, the John Wickliffe was running up to the NbE. with a fresh WNW. to Westerly breeze, going from five to eight knots, with a heavy head sea.

<sup>\*</sup> The Captain promised accopy of the log to Capt. Twynham, but left without giving it. Had we not a hundred instances of the kind, we could not believe that, after passing through such peril and loss, men will not take the trouble of desiring any boy or junior officer on board, to copy three days' logs! for those who are trying to teach them how to avoid such misfortunes in future.



On the 30th November.—Midnight to noon, the wind is marked between West and NW. and gradually decreasing to two and a half knots. Noon latitude 5° 43' North, longitude 86° 15' East, with a heavy head sea. P. M. wind West to WSW., at 5, NW., at 7, NEbN., and at 8, calms and variable, till at 9, a light breeze sprung up from the South, veering a little to the West. At midnight, ship going four knots.

On the 1st December.—Fine Southerly and SS. Easterly breeze to noon, when barometer marked 29.80, latitude 7° 9' North, longitude 85° 42' East. The same breeze with cloudy weather to midnight.

## Ship WILLIAM ABRAM'S Note from Capt. BIDEN.

The Ship William Abram, on the 30th November in latitude 4° 36' North, and longitude 90° 10' East, thermometer at 80°, and sympiesometer at 29.65, had the wind from noon on the 29th, in light squalls from the NW. and at midnight and towards noon on the 30th, variable from the South, with squalls and heavy rain.

Peninsular and Oriental Steam Navigation Company's Ship HINDOOSTAN, Capt. Moresby. From Point de Galle, bound to Madras.

I am indebted to Capt. Moresby for this very interesting log, which as it details a new experiment of high interest to us, that of a fine, well appointed and ably commanded Steam Ship, steaming through the centre of a hurricane, I have printed at length.

Log of the Peninsular and Oriental Steam Navigation Company's Steam
Ship Hindoostan. From Point de Galle towards Madras.

н.	Courses.	к.	F.	Winds, &c.	Bar.	Remarks, Monday, Dec. 1st, 1845.
1 2 3 4	NE. NNE. NbW.	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	4 4 4 4 4	NNW.		A. M. Fresh breeze and cloudy.  At 2 Sounded, 6 fathoms. At 2, latitude by Canopus 6° 27' North. At 4, sounded in 60 fathoms, no ground. At 5-30, saw the land to the NW.
1 2 3 4 5 6 7 8 9 10	ENE. NNE.	777777777777777777777777777777777777777	4 4 4	Ther.	29.71 76°	At 6, saw the Basses right a head, distant about 2 miles, hauled out to ENE. At 6-20, sounded, no bottom at 70 fathoms when Saddle hill bore NNW. Chimney hill NW W. and the middle of the Basses NoW. At 8, cloudy weather; visited ship—squally appearances. At
12		7	4			11, hard rain; noon hard squall of wind and rain, with thick uncomfortable weather. Found we have experienced a current of 46 miles against us.

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Distance Steamed. Longitude Chronometer. Latitude Observation.

Va	rious courses	, 140	mile	s. ° 8	2° 10′ E	ast 6° 50' North.
1 2 3 4 5 6 7 8 9 10 11	North. NoE. NNE. NNE.	7 7 7 7 7 7 7 6 6 5 5 5 5 3 3 3 3		North.  North.  North.  North.	Bar. 29.69 29.64 29.60 29.50 29.00 29.00 28.90 28.90	P. M. Hard squalls from Northward with heavy rain. At 3, passed a small Brig standing to the Southward. At 5, hands employed lashing and securing every thing on deck and below. Carpenters screwing the ports and gangways in. At 8, fresh gale and heavy constant rain. Well, 24 inches. 11-30, strong gale with a heavy swell from NE. shipping a great quantity of water, put fresh gaskets on all the sails. Midnight, shipped a sea in the saloon through the stern ports.

н.	Courses.	К.	F.	Winds, &c.	Bar.	Remarks, Tuesday, Dec. 2nd, 1845.
1	East.	3		East.	28.90	A. M. Wind lulled suddenly and
1 2	North.	3 5		SW. to S.	28.90	shifted round to the Southward, and
3	East.	2	•••	SW. to {	29.00	blew a perfect hurricane, veering gra- dually to the S. Eastward. At I, run-
4	North.	5		Page 1	29.25	ning before the wind and sea, the star-
5	NbW.	6		SE.	29.40	board jolly boat's davit broke, the
6		6	**		29.54	boat hanging only by the port tackle
7	3-3-3	6	4		29.61	and stopper, cut it a drift as it was
8	**	6	4		29.62	beating heavy against the stern. At
9		7			29.62	1-20, the starboard cutter was lifted by
4 5 6 7 8 9 10	NNW.	5 6 6 6 6 7 7		ESE.	29.62	the wind and thrown up on the top of
11		7	4		29.64	the awning stanchions, and its own da-
12		7	4	1	29.64	vits, secured it as well as possible.

Distance Steamed. Longitude. Well at 2 A. M. 3 inches. Lat. Observation.

Various 140 miles. Long. by act. 82° 20' East. No observation Lat. by act. 8° 41' N.

1 2 3	{ NNW. }	8	-	SE.	29.74	At 2, the chocks of the fore yard carried away, secured the yard with fresh lashing. At 4, strong gale with a heavy following sea, wind veering from
3 4 5 6 7 8 9	NNW.	***	4 4 4	East.	29,80	South to SE. Carpenters with seamen securing and sailing the skylights, &c. At daylight got the starboard cutter in board and secured, she is almost knocked to pieces. At 8, moderating. At 9,
9 10 11 12		08888	4 4 4	se.	29.80	squally, noon squally with rain. Carpenters fitting dead-lights, opening ports, &c. At 4, strong breeze and cloudy rain. At 8, squally from NE. visited ship and found all right. Midnight, wind variable from the SE.



Remarks, Wednesday, Dec. 3rd, 1845		Winds, &c.	F.	K.	Courses.	н.
A. M. Moderate, wind with a heav	Well.	NE. to SE.	4	8	· NNW.	1
At 2, lat. by Canopus 10° 25' North.		and the summer	4	888888888888888888888888888888888888888		2 3 4 5 6 7 8 9 10 11 12
At 2, ditto, Sirins, 10° 24' North.	Dry.		4	8		4
Daylight thick hazy weather. A		East.	4	8	::	6
			. 4	8	-	7
	Dry.		4	8		8
Mary South Early Bridge Bridge Company	Chief the	ESE.	4	. 8	12.	10
The particular to the second	1		4	8		11
	1 353	1	4	8		12

Captain Moresby remarks in a letter to me, that "during the first part of the hurricane, the atmosphere felt very close and warm."

## Ship. FRANCES.

Captain Biden has furnished me with an extract from the log of the ship Frances, from Colombo to Madras, which vessel was on the 29th November, in 6° 4′ North, and on the 2nd December in 11° 39′, but has no intervening observations or latitude by account given. She was probably, Capt. Biden says, about sixty miles from the Ceylon shore. She evidently ran up just before the storm reached that meridian, having had strong SE. and Easterly gales on the 1st and 2nd.

Ship Carnatic, bound to Bombay. From the Bombay Chamber of Commerce.

This ship was standing in to sight Cape Comorin, and at noon on the 1st December was in latitude 4° 25' North, longitude by chronometer 78° 43' East, her barometer 29.70, symplesometer 29.50, and thermometer 84°, with a moderate breeze from the North, cloudy, light rain, and a heavy head swell. By midnight the wind had veered to the Westward, (I suppose about NW.?)

2nd December.—Daylight increasing North Westerly breeze, latitude at noon 5° 21' North, longitude 79° 33' East, barometer 29.66, symplesometer 29.16, thermometer 81°. r. m. Fresh breeze from the Westward, and unsettled weather with a confused sea. At 8 r. m. to midnight. The same

wind at SW.



At noon on the 3d.—Latitude 6° 46' North, longitude 78° 29' East, barometer 29.80, symplesometer 29.20, thermometer 84°.

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Ship Bolton, Capt. T. Davidson. From the Bombay Chamber of Commerce.

This ship was also like the Carnatic, standing in to sight Cape Comorin, and the abstract from her log is given in a tabular form, which I print below. It appears that like the Carnatic, she just felt the South-western quadrant of the storm, which was wrecking the Florist at Tuticoreen in its passage over the Peninsula.

Extract from the Log of the Ship BOLTON.

Dates.	Latitude.	Longitude.	Barometer.	Thermome- ter.	Wind.	Remarks.
1st Dec.	4 40 N.	77 87 E.	29.90	83	NNE.	Fresh winds and cloudy. Ship 43 miles West of ac-
2nd ,,	5 50	77 24	29.80	84	W. to NW.	First part light airs, lat- ter part heavy squalls of wind and rain, weather very unsettled.
3rd "	7 17	77 10	29.60	83	W. to N.	First severe squalls with torrents of rain, latter part calm.  Found the current to
4th ,,	78,	77 42.	29.80	82	Calms.	have set these last 24 hours S. 50° E., 42 miles.

# Ceylon and the Southernepart of the Peninsula of India.

We now take the data which relate to the passage of the storm over Ceylon and the Southern extremity of India. These are mostly but detached notes, but will enable us to trace the vortex pretty accurately; as to time at least, to the Malabar Coast. It will be recollected that we had the log of the *Hindoostan* Steamer off the Eastern Coast of Ceylon, steaming through the Eastern verge of the centre, a little after midnight of the 1st and 2nd, being then about thirty miles from the shore, and to the ESE. of Baticolo.

# Captain BIDEN, Master Attendant of Madras, says :-

"The Master of the War Steamer Spiteful says, it blew hard at Trincomallec on the 1st, from East and SE. Several trees were blown



down, but the fury of the gale was to the Southward, and what is very remarkable, is, that although the strength of the hurricane was about the Hindoostan's position, yet a vessel arrived at Trincomallee that was off the Basses on the 1st, and she was perfectly becalmed, yet the Ceylon paper states, that it blew hard at Point de Galle. The Master could not tell me the range of the Spiteful's barometer. However, the reports I send you, shew that this gale extended from several degrees East of Ceylon, across that Island to Tuticoreen, Tinevelly, and Ootacamund on the Neilgherries, and to Quilon on the Malabar Coast, where I suspect it was confined within a narrow compass, in a North and South direction. It was squally off Calicut, but was scarcely felt at Tellicherry. The H. C. Sloop of War Coote, struck on the reef off Calicut on the 1st, and the foul weather on the 3rd broke her up.

"We were apprehensive of bad weather here, as the surf was high with a turbulent sea, heavy clouds all gathering in the SE. and as a ship came in from the Northward on the 2nd and experienced very fine weather, and our Steamer the Hindoostan had not arrived, I was clearly of opinion, that she had encountered a gale to the Southward, and so it proved to be the case. We had very threatening weather on the 16th, I prepared the shipping by signal to "prepare to slip and put to sea." Barometer fell from 30° to 29° 88', however, although the clouds portended wind and rain, we had but little of either. On the 25th and 26th, barometer ranging from 30° 10' to 30° 18', we had the heaviest fall of rain we have experienced this year, and serious alarms are happily relieved by that providential downfall, but how are we to account for such a dense atmosphere, and so much rain, without the mercury indicating so great a change? The symplesometer also rose a day or two before, and continued steady-there was but little wind throughout, the weather was close and the thermometer higher than usual at this season, viz. from 78° to 82°.

"A large ship under jury masts was seen off Trincomakee on the 19th instant. Capt. Maitland steamed out of the harbour at daylight, on the following day intending to offer assistance, but the stranger was out of sight, and the Spiteful having but few coals, and none in store at Trincomallee! Capt. Maitland was reluctantly compelled to put back. The ship Robert Small, homeward bound, sailed from these roads on Saturday evening the 29th, and must I think, have run right into the



heart of the gale, as she started with a fresh NE. wind. However, she is ably commanded and well managed."

Capt. Biden in an additional note adds—"Capt. Maitland, H. M. Steam Vessel Spiteful, reports that the gale was severe at Trincomallee on the 1st instant, and that a complete hurricane raged at Baticolo and to the Southward. Ceylon papers of the 13th instant, report, that the gale though brief, was very severe at Point de Galle on the night of the 1st, and during the 2nd instant.

"The ship Caledonia from Singapore to Bombay, has also put in at Galle, having lost top-gallant masts, top-sails and fore-sail, and quarter boats, and thrown part of her cargo overboard, in a heavy gale from South, SE. and East, on the 30th ultimo, in latitude 7° North, and longitude 88° East.

"At Tuticoreen the ship Florist, loading for China, was wrecked on the night of the 2nd instant, on a reef off Tuticoreen.

"The gale was violent at Quilon on the night of the 2nd instant, and at A. M. of the 3rd instant several *Dhonies* were driven on shore, and beat to pieces. The *Charles Forbes* encountered the gale off Anjengo, and the time verified by her log may be considered as more correct than that which is reported from Quilon.

"The hurricane raged with great violence at Tinevelly and at Ootacamund, but I have not been able to obtain the ranges of the barometer."

C. Biden.

# From Mr. Higgs, Master Attendant of Trincomallee.

I have the following register of the weather from the 30th November to the 3rd December, but have altered the letters which designate the weather to words, as the former are not generally understood.

Mr. Higgs, says in his letter to me, "during the night of the 1st and morning of the 2nd instant from Trincomallee on the road to Kandy in a SE. direction, a vast number of large trees were blown down so as to obstruct the road, and at Habboneme, fifty miles distant, the travellers' bungalow was blown down; there has not been a settled gale of wind at Trincomallee for the last eleven years, but we have frequently had in the months of November and December, a heavy swell rolling in from the NE, when there have been gales in the Bay of Bengal.

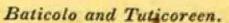
[845.]	Fourteenth	Memoir	on	the	Law	of	Storms	in	India.	

-	r in De-	er.	Win	ds.		Inches.	
н.	Barometer in Inches and De- cimals.	Thermometer.	Quarter.	Strength.	Weather.	Rain. Inc	30th November, 1845. Remarks.
2	ALL SECTION	No. 20	Me hield		The up	A District	a line of the second second second
4	- tables	mi) =	w.brite	Mar.	Side	A CONTRACTOR	great man, the trade and place
6	29.79	_78	NE.	5	12.0		Cloudy and blue sky.
8	29.80	81		5	orara	States.	municipal and a second
10	29.82	79	NNE.	5	1 110		Overcast and squally. *
12	29.82	82	NE.	5			Cloudy and blue sky.
2	29.76	82		5			A high sea from the Eastward.
4	29.76	81		5		-	The state of the s
6	29.76	80		5	100		Overcast.
8	and en		1000	STR.		1196	Carpallan on Stranger
10	2 200	HIST	STEEL STEEL	NO. BO	A lib	A CONTRACT	
12	100 m	tiols.	in the latest	-	N Salar	had-	the Landschild of VALS (20)

1	e. I	6	Wind	is.	-	nes.	the format have only to the first
н.	Barometer in Inches and De- cimals.	Thermometer.	Quarter.	Strength.	Weather.	Rain. Inches.	1st December, 1845. Remarks.
2			NE.	6		**	Overcast and squally.
4			••	6			
6	29.76	76		7			A very high sea in the offing (from East.)
8	29.76	77		5			Rain in showers.
10	29.78	77		5			**
12	29.74	79		5	4.	de la constante	Blue sky and cloudy.
2	29.70	78	NEbN.	6		Lotte	2000 A 1000 200 35 年 年
3	29.68	76	11000	7			Violent gusts with rain.
4	29.68	76	NE.	. 6			Rain.
6	29.68	76		6	4		
8	29.68	76	4	6			
10	29.68	76	ENE.	6			
12	1	1	dans.	1	alle sale		STATE OF THE PARTY



	Barometer in Inches and De- cimals.	e	Wit	ids.	•	es.	
1 1843	Barometer ches and D mals.	Thermometer.	S STORY	-		Inches.	2nd December, 1845.
	rom es a) ls.	mon	Quarter	Strength.	Weather.	The state of the s	Remarks.
H.	Baron Inches: cimals.	her	Mar	tren	Vea	Rain.	是15 8是 17 <del>年 第</del> 18 18 18 18 18 18 18 18 18 18 18 18 18
-2			East.				* * * * * * * * * * * * * * * * * * * *
	190	••	A CONTRACTOR OF THE CONTRACTOR	9	-	•••	Most violent gusts with rain.
4	**	lines.		8	901	Cath ma	TO THE WAR THE
6	29.66	76	ESE.	7			Many trees blown down and
8	29.68	78		7		3	large branches strewed around. The beach covered with fish at
			To the	TOK U	100	1	daylight. A very high sea from the East
9	29.70	79	**	δ		3	rolling in.
10	29.71	79	SE.	6		HAM	prosition and under a real
12	29.71	77		6	••		Gloomy weather.
2	29.68	78	East.	6		**	Hazy.
4	29.68	78		6		0	
6	29.70	7,7	••	4	45/3		
8	29.72	76	SE.	3	Late Sa	35.514	could be a set of the country of the
10			Zoll I		383	Septe	THE SECRETARIAN AND REST THE
12		H 40 T			1	-	the same of the same of
	, E &	4	Wi	nds.	Contract of	es.	FOR SHOOT WELLS LIST THE MANAGE
	meter in and De-	ermometer.				in. Inches.	3rd December, 1845.
	rom es au ls.	1011	uarter.	Strength.	eather.	-	Remarks.
H.	Barometer i Inches and De	Ther	-å°	irei	Wea	Rair	SALTE PROBLEM TO THE
- 2			The state of the s			1 1	
-		-			-	-=-	
	S S S S S S S S S S S S S S S S S S S	1			•		
4		rai- ir	sw.		•		Clearer.
4 6	29.77	75	sw.	1	•	•	Clearer.
4 6 8	29.77 29.82	75 77		1 0	•	**	Smooth Sea.
4 6 8 10	29.77 29.82 29.86	75 77 79	NNE.	1 0	•	•	
4 6 8 10 12	29.77 29.82 29.86 29.84	75 77 79 *81	NNE.	1 0 1 2	•	**	Smooth Sea.
4 6 8 10	29.77 29.82 29.86	75 77 79	NNE.	1 0	•	**	Smooth Sea.  Overcast and squally.  Up to the 10th we had light
4 6 8 10 12	29.77 29.82 29.86 29.84	75 77 79 *81	NNE.	1 0 1 2	•	**	Smooth Sea.  Overcast and squally.  Up to the 10th we had light variable winds, on that day at noon, a steady NE. wind set in,
4 6 8 10 12 2 4	29.77 29.82 29.86 29.84 29.80 29.79	75 77 79 *81 82	NNE.	1 0 1 2 3	•	Be.	Smooth Sea.  Overcast and squally.  Up to the 10th we had light variable winds, on that day at
4 6 8 10 12 2 4 6	29.77 29.82 29.86 29.84 29.80 29.79	75 77 79 *81 82 81 80	NNE.	1 0 1 2 3	•	Be.	Overcast and squally.  Up to the 10th we had light variable winds, on that day at noon, a steady NE. wind set in, which continues. Trincomallee
4 6 8 10 12 2 4 6 8	29.77 29.82 29.86 29.84 29.80 29.79 29.79	75 77 79 *81 82 81 80	NNE.	1 0 1 2 3 3	•	Be.	Overcast and squally.  Up to the 10th we had light variable winds, on that day at noon, a steady NE. wind set in, which continues. Trincomallee
4 6 8 10 12 2 4 6	29.77 29.82 29.86 29.84 29.80 29.79	75 77 79 *81 82 81 80	NNE.	1 0 1 2 3 3 0 4	•	Be.	Overcast and squally.  Up to the 10th we had light variable winds, on that day at noon, a steady NE. wind set in, which continues. Trincomallee



From the Colombo Observer of the 13th and 18th, I collect the following notices of the storm at the above named places, the notice of the 18th is a well written letter, evidently by a careful observer at Baticolo, and I have used the other notices only to supply a few words.

Batticaloa.\*—This place was visited by a most fearful hurricane on the night of the 1st instant. The day had been very wet and stormy with squalls from the NE., but this was considered as no more than the usual monsoon. However, about midnight, it began to blow with great fury from the NW., or along the coast, with heavy rain. About half-past 2 A. M. of the 2nd, the wind shifted round to the opposite quarter, and after a short but ominous lull, blew with truly terrific violence from the South and SE., occasioning wide spread, and almost universal, destruction of trees and native houses, and even of bungalows. The roaring and hollow moaning+ (as noticed by many) of the hurricane, the incessant dash of the rain, and a complication of other noises, were most dismal, but in fact even the crash of thousands of falling trees could not be distinctly heard, though it must have added to the general uproar. No body could say if it thundered, but a great light was observed at one period of the storm, which probably was caused by some electric explosion. The hurricane did not extend to the country at the most Southern extremity of the lake of Batticaloa.

Tuticoreen.—The effects of the gale are thus described in a letter dated the 4th instant (December.) The gale commenced about 8 P. M. (the date is not given, but in the paper of the 15th, the Florist is said to have been lost on the night of the 2nd,) and raged with unremitting fury till 3 A. M., after which it abated, and about sunrise there was a comparative calm. The wind was from SE. accompanied with torrents of rain. During the night the ship Florist, of 538 tons, was driven on shore.

For the following observations from Palamcottah, Cochin, Trevandrum, Quilon and Alleppy, I am indebted to Major General Cullen.

This is no doubt the correct spelling, but Horsburgh, and all the charts use Baticolo, which I have therefore preferred.

<sup>†</sup> I have noticed this before (VIIth and XIth Memoirs, and Horn Book of Storms,) there is no doubt that it does occur in hurricanes very frequently. Is it an electric phenomenon, analogous to the remarkable rumbling which proceeds a hail storm in India, and often in Europe?

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Meteorological Observations at Palamcottah. By Conductor Thomas Darling of the Ordnance.

		•	then N.E.	iolent t and t, At to the about Clear			SE,
Remarks.		Clear and dry: gentle Northerly breeze.	Dark haze with a slight drizzling rain now and then during the day. Wind blowing fresh from N E.	at 4 p. m., with heavy rain. At 11 p. m. A violent gale from the East, by which all the oldest and largest trees were uprooted and laid prostrate. At Midnight. Very violent, the wind veering to the SE. accompanied with heavy rain until about 14 a. m., when the hurricane abates. 6 a. m. Clear and fair with a fresh breeze from the SE.	Northwards clear: fresh breeze from SE.	Clear: wind fresh from Southward, evening.	Clear, light, cool N. wind: evening fresh from SE.
Dall	of Rain.	:	:				
ter.	Wet Bulb.	73	72		28	9/	9/
Thermometer.	.mumixeM	85	:	DE LA SOLA	844	84	8
l'herr	Attached.	29-796 854	:		38	22	88
	Barometer.		:		-800	-842	·764 852 85
	Hour.		"		=	=	25
ter.	Wet Bulb.	•=	7	with the same of the	75	75	15
Thermometer.	.mumixeld	781	73		78	79	92
Ther	Attached.	79.3	78		791	8	807
Barometer.		29-916	088-		998-	-954	-874
	Hour.				•	=	
1 LUTEUR	since in • he		2	Tell Sons at	က	4	5
1845.		December,		of the state	tinte.	*	



Register of the Barometer at Cochin, during the Gale of the 3rd December, 1845.

Date.	Time.	Bar.	Ther.	Dew point by Daniell.	Remarks.
1845.	776		0		中国 中国 中国 中国 中国 中国
Nov. 29	91 A. M.	30.232	81	64)	Carried Control of the Control of th
30	94	-190	813	65	0.3
Dec. 1	94 *	-200	80%	64 }	Generally dry Easterly winds, as shewn
2	94 ,,	-144	81	67	by the dew point.
		-050	811	67 1	
3	61	29.980	77	×22 × × × × × × × × × × × × × × × × × ×	Violent gale from NE.
12 11	200	-964	76	72	Ditto ditto, increasing.
** **		-980	76	×	Slightly moderated and more Easterly.
	77.1	30.000	77	×	Moderating, EbS.
11 13	A CONTRACTOR OF THE PARTY OF TH	THE REAL PROPERTY.	1000	V1	Strong gale with occasional violent gusts
** **	71	.012	77	1 1	East and SE.
	73 ,,	-026	7.7	×	Wind moderate ditto ditto E. & SE.
** **	9	•050		XXXXX	Breeze moderate ditto ditto SE. & S.
- 11 11	91	-058		×	Strong wind again ditto ditto SE.
** **	l oi	-070		×	Ditto ditto with heavy rain from SE.
21 27	93	-114		×	Moderate breeze ditto ditto SE.
** **	0	-130	77	74	Rather strong ditto ditto SE. & S.
10 11	0.1	-142	77		
39 19	110	-154	77	××××	THE RESIDENCE OF THE PARTY OF T
** **	101	+158	77	×	Moderate breeze SSE.
11 11		-160		×	Ditto ditto Southerly and SWesterly.
** **	10	-160		×	Ditto ditto Southerly and SWesterly.
** .**	1 0 10	WHEN BUTCH		X	
** *	0.1	-130		×	and the second s
11 1	d de	-130		XXX74	Breeze Southerly.
** *		374796		68	
3.3	Da we we	-218		70	
**	9 A. M	3 - 2		73	
**	9 A. M	224		76	3

About one inch of rain fell from midnight on the 2nd to noon on the 3rd.

## Barometer at Trevandrum.

Date.	Time.	Bar.	Ther.	Remarks.
1845. November, 29 30 December, 1 2 3 3 4 3 5 6 7	91 A. M.	29-930 -864 -844 -960 -990 -928 -854 -822 -874	82 82 814 82 80 83 81 814 82	Three inches of rain.

At Trevandrum.—It appears to have blown very strong, at 1 A. M. of the 3rd a violent gale from  $2\frac{1}{2}$  to 3: abated from 3 to  $3\frac{1}{2}$ : when it recommenced with greater violence, than ever, and continued till about daybreak.



At Quilon.—The Master Attendant writes that—"The gale commenced at 10 P. M. of the 2nd, and continued till 7 A. M. of the 3rd."

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At Alleppy.—The Master Attendant writes—"A gale of wind with some rain commenced at this place about midnight on the 2nd, which continued till daylight on the 3rd, when it blew a perfect hurricane.

At Cannanore.—A correspondent writes—"The gale on the 3rd commenced here as far as I can remember, about 8 A. M., and lasted till about 1 P. M. At first from NE. and East, and latterly from SE. and SSW. Hardly any rain fell."

Remarks on board the Ship Faize Rohabanny, Thomas Stewart, Commander. From the Bombay Chamber of Commerce. Reduced to civil time.

December 2nd.—Light SE. breezes and cloudy.—Midnight. Squally; wind veered to the Eastward, in twenty-six fathoms off Cadiapatam Point. Barometer 29.95.—P. M. Wind WNW., a fresh breeze, and cloudy, with constant rain.—Sunset. Barometer 29.80: dark cloudy weather: wind increasing to a gale.—At 9 P. M. Barometer 29.70: strong gale from the SW.: a high confused sea: lying to under close-reefed main-topsail: thirty-three to thirty-five fathoms.—Midnight. Violent squalls from the Westward with heavy rain, lightning from the Eastward. Barometer 29.50.

3rd.—At 3 A. M. Barometer, 29.45: the wind veered round to the Southward.—Noon. Calm and sultry weather: off Cape Comorin: twenty-nine fathoms. Barometer 30.5.—P. M. Wind NNE.: light breeze and clear weather.

4th .- Noon. Cape Cereorin NE. : after which fine weather.

Abstract of the Log of the Ship Charles Forbes, Captain Wills; from China bound to Bombay. Civil time. From the Bombay Chamber of Commerce.

December 1st 1845.—A. M. Light Northerly and NNEasterly airs and hazy weather.—Noon. Winds ENEasterly: Latitude 7° 52' North:

1845.]



forty-six fathoms water.—p. M. Winds dight and veering to the Southward and South-westward.—Midnight. Light NWesterly winds and fine weather.

2nd,—A. M. Light Northerly and NEasterly winds and fine weather.—Noon. Winds variable and light: Latitude 8° 48' North: twenty-six fathoms.—F. M. Calms with occasional light variable airs.—Sunset. Wind NW. and increasing; the weather very unsettled; heavy clouds hanging over the land with lightning.—At 8. Light breeze and cloudy, with rain; tacked off shore.—At 9. Increasing breeze with squalls: Barometer 29.80: Sympiesometer 29.20.—At 10. Hard squalls with a heavy swell: Barometer 29.75: Sympiesometer 29.12.—At 11. Wind NNW. and increasing, and sea rising.—Midnight. Blowing a perfect gale NW., and high sea. Barometer 29.62: Sympiesometer 28.90.

3rd .- A. M. Hard gale with severe squalls, and high sea .- At 2. Hard weather with thick heavy rain: Barometer 29.56: Sympiesometer 28.86. -At 4. Wind veering to WNW. and Westward: the topsails blown from the bolt ropes, leaving the ship under bare poles, the sea running very high: Barometer 29.50: Symplesometer 28.78.—Daylight. The wind veering to the South-westward. Wore ship and set the mainsail; ship labouring much in the high confused sea, the rain ceasing.-At 7. The wind lulling at times, and weather clearing over the land, but a very high confused sea; the ship pitching and labouring much, in which we carried away flying-jib-boom, spritsail yard and dolphin-striker, and stove in the jolly boat, hanging at our stern: Barometer 29.70: Sympiesometer 29.0 .- At 8. Wind decreasing at SSW.: enabled to bend new sails, and to set the fore-topmast staysail, and storm mizen, to steady the ship: Barometer 29.86: Sympiesometer 29.16.—At Noon. Weather much more moderate with less sea. Latitude 8° 58' North; in forty-one fathoms water .- P. M. Decreasing SWesterly, and Southwly breeze, and fine weather .- Sunset. Light Southerly breeze and fine: Barometer 29.86: Symplesometer 28:20.\*—Midnight. Land breeze, light and variable.

Ships along the Malabar Coast, and Magnetic Storm at Bombay.

By the zealous care of Mr. Scott, Secretary to the Bombay Chamber of Commerce, I have been furnished with several logs of ships along the

<sup>•</sup> The Symplesometer is always 0.50 to 0.60, below the Barometer.



coast, shewing how they were just on the Northern range of the storm on the 2nd, 3rd, and 4th December: the 2nd and 3rd being, it will be recollected as above, the day of the Charles Forbes' storm, and the 3rd of that of Cananore, in latitude 11° 52½ North. I note these for brevity's sake, in separate paragraphs.

The Recovery, Capt. Johnson, on the 2nd at noon, was in latitude 12° 29' North; in forty-one fathoms water. Her barometer, a French one, at twenty-seven inches eleven lines, (equal to 29.76 English) having fallen to this, from twenty-eight inches one line, French (29.94 English.) From the 1st, during the day, had the land and sea breezes, but at midnight it was dark and cloudy.

December 3rd.—Dark cloudy and variable.—Noon. Strong wind with heavy head sea from the NW. Latitude 12° 57' North; in forty-one fathoms water, wind NE. Barometer twenty-seven inches ten lines French (29.67 English) and in a note from Capt. Johnson says, "usually on the coast at this season, twenty-eight inches two lines, French (30.03 English).—At 3 p. m. A sudden squall with change of wind to the SSE. and very threatening appearance; by midnight, clear again.

4th.—1 A. M. Fresh breezes, cloudy, and heavy following sea from the SW. which continued to noon, when in latitude 14° 53', North; and forty-five fathoms water; strong SSW. sea. No barometer marked this day.

5th.—Dark cloudy and unsettled, but light winds with strong swell from the SW, and a cloudy wild appearance. Latitude 16° 40'; in forty-one fathoms. Barometer twenty-seven inches ten lines, (29.66 English.)

Ship Charlotte.—Her Commander says in his note. From the 1st to the 4th instant. Land and sea breezes prevailed with hot sultry weather during the day, and cloudy with heavy dews during the night. On the morning of the 4th, the wind freshened up at North and continued freshening till noon, when it veered round to the NE. Sacrifice Rock then bearing NbE½East; distant about six miles (latitude about 11° 24' North) in soundings of from sixteen to seventeen fathoms.—At 3 p. m. The wind increased to a fresh gale at East, running before it under our topsails; the clouds dark and disordered, going from East to SE.—At 6 p. m.—The wind moderated to a fresh steady breeze,



made all sail, running along the land in soundings of nineteen to twenty-two fathoms. At 10 at night, the wind wore to the SE. and continued a steady breeze at South to SE. all next day. The 5th when at noon St. George's Island, bore NNE½East. Latitude observation 15° 11' North; distance off shore about ten miles; the weather moderating, but very hazy: the barometer and thermometer showed no symptoms of any change during the strength of the breezes: the latter part of the 5th decreasing winds with cloudy weather, with a cross turbulent sea.

## Barque MARCHIONESS OF DOUGLAS.

Had fine weather from the 2nd instant; latitude 14° 14' North, longitude 73° 34' East, to the 4th instant in latitude 15° 43' North, longitude 73° 27' East. The winds moderate and light from NE. to NNW, and latterly SE.

## Ship EARL OF CLARE.

Fine, land and sea breezes, from the 2nd instant; latitude 14° 38', to the 4th instant, 16° 17' North, while passing the Coast.

### BOMBAY.

## The recent Magnetic Disturbance.

The Hurkaru, in copying the letter we received sometime ago from Professor Orlebar, describing this phenomenon, makes the following observations, which we commend to the notice of the learned Professor himself, and all others interested in Meteorology.

Orlebar, in charge of the Observatory at Bombay, descriptive of a remarkable magnetic disturbance,—'a magnetic storm,' which was indicated by the apparatus under his care, on the morning of the 3rd instant. The Professor remarks that "it will probably appear that this week has been accompanied with remarkable phenomena on every quarter of the earth." May not this unusual disturbance of the magnetic fluid have been in some way connected with the rotatory hurricane which was experienced by the Hindoostan off Ceylon, on the 1st and 2nd instant, and which, travelling to the NW. might have been sufficiently near Bombay on the 3rd to produce the phenomena observed by Professor Orlebar?" '—Bombay Courier; December 30th.

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Ship John Brown, R. Brown, Commander. From the Bombay Chamber of Commerce.

From the log of this vessel, of which the track will be seen on the chart, it appears that on the 3rd and 4th December, she was running in to the ENE.; towards, and in the passage between, the head of the Maldives and the Southern Laccadives, and that on the 4th at noon when with the Charles Forbes, the weather had quite moderated to fine, the John Brown was within a few miles on the same parallel of latitude as the Forbes on the 3rd, but about 170 miles West of her position, in longitude 73° 29' East with steady breezes and gloomy weather, the wind about SW. and a heavy sea, which they supposed to be caused by a current setting to the ENE. Her barometer (probably too low) was at 28.80; the thermometer 87°.

Abridged Log of the Ship MARY ANNE, Captain Allen, from London to Bombay. Reduced to civil time. From the Bombay Chamber of Commerce.

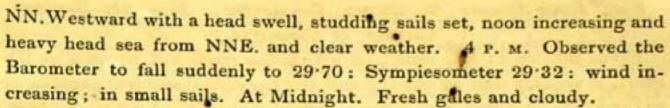
At Noon 5th December, 1845.—Increasing breezes NNW. with a heavy head sea: Latitude 8° 7' North: Longitude 71° 15° East: Barometer 29.45: Symplesometer 29.30: Thermometer 83½°.—Towards midnight decreasing and cloudy.

6th.—A. M. WSW., increasing to noon, when Latitude 9° 54' North: Longitude 71° 16' East: Barometer 29.40: Symplesometer 29.26: Thermometer 82°: heavy confused sea from the Northward.—P. M. Wind West.—At 7, Southerly, rapid scad, much lightning and sea.—At 5 P. M. barometer fell to 29.35, and symplesometer to 26.24.

7th.—Noon fine weather: Latitude 12° 54' North: Longitude 11° 0' East: Barometer 29 50: Symplesometer 20°36: Thermometer 83½°. After which fine weather and cams.

Abstract of the Log of the Ship Rajasthan, Captain Stewart. from London bound to Bombay. Reduced to civil time. From the Bombay Chamber of Commerce.

On the 4th December, 1845.—Rajasthan was at noon in Latitude 9° 55' North: Longitude 69° 0, East: Barometer 29.85: Symplesometer 29.42: Thermometer 83° 3'.—A. M. Freshening to steady; fresh wind from the



5th December. —6 A. M. Split fore and main-topsails: wind rapidly increasing to a hard gale NW., and sea much agitated, rising in pyramids\* and breaking frequently on the ship, hove to on the larboard tack, under mizen and fore-topmast staysails. Noon. Latitude 11° 42′ North: Longitude 71° 5′ East. Barometer, noon 29.85, 4 P. M. 29.70. Symplesometer, noon 29.42, 4 P. M. 29.32. At 0.30. P. M. Wind shifted to WSW. tremendous sea running, and ship labouring violently. At 4 P. M. A heavy gust with rain, when the violence of the wind abated during the night, the wind rising in heavy gusts, with intervals of calm, a dark cloudy sky and drizzling rain.

6th.—4 A. M. Wind shifted to SE. and barometer "on the turn."† At 6. Fresh gales with passing squalls: made sail and bore away NNE., weather clearing up and sea rapidly going down. At 8. Single-reefed topsails. Noon. Latitude 12° 32′ North: Longitude 71° 43′. Barometer, noon 29.70, 4 P. M. 29.60. Sympiesometer, noon 29.32, 4 P. M. 29.22. P. M. Steady breezes and showery, after which fine weather.

Captain Stewart has further obliged me with the following very instructive Remarks.

"1. On the evening of the 4th December, I observed a remarkable kind of lightning to N. Westward, shooting up perpendicularly from the horizon in stalks, or columns, of two and three, at short distances; it was not at all bright, but rather of a dullish glare.

"2. My barometer fell lowest on Saturday, after the greatest violence of the wind from NW. and SW. was past, which led me to expect that

† It appears by this expression to have been lower than 29.70, between 4 P. M. of

the 5th and 4 A. M. of the 6th, but is not, unfortunately, registered.

<sup>\*</sup> A remarkable instance, but which doubtless often occurs without being noted, of the pyramidal sea beginning very early in a gale: I account for it by supposing the NN. Easterly sea crossed and broken by the N. Westerly gale.

<sup>†</sup> This is almost, word for word, Capt. Rundle's description of this remarkable kind of lightning. See 11th Memoir, Journal Asiatic Society, Vol. XIV, p. 71, where I have also quoted another instance of it. We might almost term it "Tyfoon lightning!"



when it shifted to South or SES I should have the height of the gale; on the contrary, there was both less wind and sea.

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- at NW. or NWbW., the centre of the storm was NE. of my position, and passing to WN. Westward, so that by running on, I should have got into worse weather; and this is confirmed by the fact, that the ship Monarch a day's sail ahead, experienced the extreme violence of the hurricane.
  - "4. With the exception of the singular lightning already mentioned, there was not a single flash, and the sky had more the appearance of a gale in the higher latitudes than a tropical storm, the scud passing swiftly in the direction of the wind with clear patches between, excepting the night of the 6th, when it was dark and lowering, with drizzling rain.
  - "5. The position of the vessel was correctly ascertained by observation, and the dates are all nautical time."\*

RATH. STEWART, Com. Ship Rajasthan.

Abstract from the Journal of Captain McFarlane, of the American Barque Star. Reduced to civil time. From the Bombay Chamber of Commerce.

"Thursday 4th December, 1845.—A fresh breeze at NWbN. and cloudy. Latitude observation 8° 41': Longitude by chronometer 66° 43' E.: Thermometer 81°: fresh breezes at NWbN., and passing clouds. Through the night, a strong breeze at N.Westward.

we have had a heavy swell from NW., the vessel pitching violently. At 10 A. M. took in the top-gallant sails. Current setting to Southward and Eastward fifteen miles in twenty-four hours. Latitude observation 10° 41': Longitude by chronometer 68° 39': Thermometer 81°. First part of this day had strong breezes at NW., and quick passing clouds. At 6 P. M. Double-reefed the topsails; a heavy sea from NNW.: through the night strong gales from NW. to North, with heavy squalls and thick, cloudy, rainy weather.

<sup>\*</sup> Altered by me to correspond with the other logs .- H. P.



"6th .- At 8 A. M. Wind NNE., more moderate; wore ship to Northward and Westward and made sail. Latitude observation 12° 6': Longitude by chronometer 71° 24': Thermometer 76°. At meridian the NW. point of Cherbaniani Bank or Reef, bore ENEIN., fifty-five miles distant. The course and distance for this day's run was NEbElE. 180 miles distance, whereas the course and distance by dead reckoning was North 33° East, 135 miles, which would make the current setting EbS1S. ninety-five miles! I was prepared to find a good deal of Easterly current here, but did not expect any thing like this. The very heavy swell we have had, which has caused the vessel to pitch and strain very much, has arisen no doubt from this cause. Since we have got into the vicinity of these (Laccadive) Islands, we have had a very thick heavy mist, it being a mere chance that I was enabled to get observations, the sun appearing but a very short time. P. M. Strong breezes at BbN. and thick hazy weather: a large irregular swell. Through the night fresh gales and cloudy.

"7th .- Fresh breezes at ENE. and a confused irregular swell. From my observations this day, it would appear that there was some mistake in yesterday's work, otherwise we have had as much Westerly current this day, as we experienced yesterday in the opposite direction. Latitude observation 14° 55': Longitude by chronometer 69° 52': Thermometer 79°."

WILLIAM McFARLANE, Master of American Barque Star.

Memorandum and Notes from Capt. Duncanson, Ship Monarch. From the Bombay Chamber of Commerce.

1845.	.   Lat. N.   Long. E.		Adie's Symp.	Remarks.		
Dec. 1st			Character of the latest the lates	Fine clear weather.		
		69° 5′		Strong monsoon with a very cross sea.		
		70° 29′		A heavy cross sea.		

At 10 P. M. Squally, and wind variable from the Northward, a dark cloud rose to the Eastward, which rapidly spread overhead, with vivid lightning and loud thunder, with a very threatening appearance. Sympiesometer fell to 29.30, and now beginning to blow hard; proceeded to get the ship under bare poles as fast as possible.



4th Dec.—Gale continued increasing till 1 A. M., on the 4th, when it blew a complete hurricane. Sympiesometer down to 28.90. The starboard cutter (a twenty-five feet boat) was blown from the davits, and the ship laid with her lee rail under water. At 8 A. M. A little more moderate, but a tremendous sea running; the wind gradually veering round from NNE., where it began, to Southward. At noon it commenced with redoubled violence, being then in latitude by account 13° 40' North and longitude 69° 6' East, and veered to WSW, then backed round to NE., blowing furiously all the time till 8 A. M., on the 5th, when we set some sail, having been lying to with a tarpaulin in the mizen rigging, for thirty-two hours previous. The sympiesometer began to rise about 5 A. M., and at noon was at 29.31, then in latitude 13° 20' North, and longitude 70° 20' East by account.

6th.—Strong breezes from NE. with hard squalls, veering to SE. with much rain, and a most cross, heavy sea. Latitude 13° 50' North: longitude 70° 3' East: Symplesometer 29.47. Experienced a current of forty miles to the Westward.

John Duncanson, Commander of Ship Monarch.

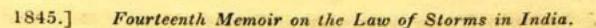
## Ship EUPHRATES.

The ship Euphrates Capt. Gifford, was on the 3rd December at noon in latitude 14° 35′ North: longitude 69° 58′ East, with a strong breeze NNE. and clear weather, becoming cloudy with lightning to the Southward: at midnight, she was standing in towards the Coast.

4th Dec.—At 3 A. M. The wind shifted suddenly in a hard squall to East with a threatening appearance. Barometer 29.85; the winds variable from the Eastward till noon, when a heavy head sea, (from the NE. to North.) Latitude at noon 15°16': longitude 71°28' East. After this time the weather was fine, the barometer gradually rising as the ship stood to the Northward.

## SUMMARY.

We have now to consider the data we have for laying down the track of the storms as I have marked them on the chart.



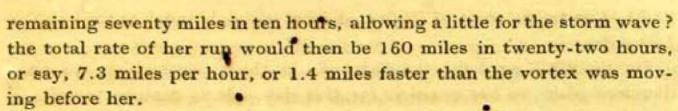
Our first log to the Eastward is that of the Caledonia, which at noon on the 29th, was in latitude 6° 50' North: longitude 88° 30' East.\* By midnight the weather was decidedly threatening, and the swell from the SW. increasing, the barometer having fallen to 29.70, with a fresh breeze from South to SSE., going about seven and seven and a half knots. We may fairly then assume, that she was now on the Eastern border of the vortex, and taking the average wind at SbE., that it bore WbS. of her. It will be noted that the Alibi was running up between the 28th and 29th to the Northward across the Caledonia's track, and experienced no bad weather, though traces of the stormy, action may be found in her remarks.

The Juliana on the 27th, seems evidently running up into the South-western quadrant of a Storm Circle, (or into a segment of the forming vortex?) which by daylight of the 28th, had passed onwards, and was veering and hauling gradually, like the broken streams of wind, of which I have, in former Memoirs, supposed the existence, to SW. and to SSE., SE. and Easterly, when it became another, and a different storm, from the Caledonia's, as we shall presently shew.

To estimate the centre on this day, the 29th, we have but its bearing from the Caledonia. Its distance from her to the Westward I estimate as follows:—

We find that on the 30th, the Caledonia was at the true calm centre of her hurricane in latitude 7° 0', longitude 85° 50'; and that a little after midnight between the 1st and 2nd, say at ½ p. m. of the 2nd, the Hindoostan Steamer also, doubtless steaming through the centre of her hurricane. Taking the Caledonia's hurricane and the Hindoostan's to be the same; this is from noon 30th to ½ A. M. of the 2nd, thirty-seven hours, and the distance between the positions is 218 miles, which gives 5.9 miles an hour for the rate of travelling of the vortex, or 141.5 miles per day. Now we find that the Caledonia in the twenty-four hours from noon of the 29th, to noon of the 30th, had made 160 miles of run, of which ninety miles were run from noon to midnight, and by 7 A. M. she was obliged to lie to, and at 10, was on the verge of the calm centre, in which at 11, she was fairly involved; or say she had made the

<sup>\*</sup> Her position on the 28th, is marked from the memorandum before alluded to.
Nothing being said of the weather from noon 28th, to noon 29th, I presume it was fine,
and the track shews how the ship was running towards the hurricane.



If we assume the hurricane to have moved at this rate above mentioned, 5.9 miles per hour, it follows that the ship in the twenty-two hours that she was chasing it, only gained upon it at this rate of 1.4 miles per hour, which would give her distance at noon on the 29th, to have been really only thirty miles from the centre! and yet with only a double-reefed topsail breeze.

This would give but sixty miles of diameter, but though we have had, it is true, instances of hurricanes which like this have not much exceeded, as far as we could judge, sixty miles in diameter, yet I am inclined to allow it somewhat more than this, and we must therefore suppose, either that it was not completely formed at noon of the 29th, though the Caledonia's barometer (29.70) would indicate that it was enough so to produce the usual barometric depression, or that it was at a greater distance and moving at a slower rate.

We have no sort of indication to guide us in this estimate, so that I have, as a mere matter of choice and probability, placed the centre this day at fifty miles WbS. from the Caledonia's position, which gives it 100 miles of diameter. It could not have been much more, for we shall see that on the 30th, when she was within the calm centre, the John Wickliffe, at eighty-two miles to the SbE. of her, was barely experiencing the remote effects of the swell, in pitching away her flying jib-boom, while her wind, though Westerly, was declining to calm. The John Wickliffe, as she ran up, must have crossed, at about 8 A. M., on the 1st, the place of the centre a little before noon of the 30th. We find that the heavy head sea is again noted, P. M., but not at midnight, perhaps this is an omission in copying, or of a careless officer? It would have been of interest to have found traces of the confused sea of the centre at the very place of it, as we have done in other instances.

The storm had not formed and moved onward at the same rate on the 28th, for then, as will be seen by measuring backwards on the chart, the Alibi would have had very different weather. We shall find in our examination of the Hindoostan's log for the day in which she steamed through the hurricane, that its diameter then (on the 1st and 1845.] Fourteenth Memoir on the Law of Storms in India.

2nd,) close to the coast of Ceylon, did not certainly much exceed 120 or 130 miles.

On the 30th, we have the Caledonia in the centre, which we must therefore place at her position for this day. It is curious to remark that though the vortex was certainly moving on at the rate of 5.9 miles per hour, as we know from the time when it was crossed by the Hindoos-'tan, yet the Caledonia seems to have lain from 11 A. M. to 6 P. M. in the calm! so that either she was carried along with the centre? or the calm space was from thirty to forty miles in diameter, and she was by the baffling SW. and Southerly winds carried round and round in it?\* It will be seen that while the longitude was found to agree with the account, it was the latitude which differed fifty miles from the observations when obtained. If the ship had been carried along by the vortex for the seven hours, this must have been detected by the error in longitude. It would be a curious fact to find a storm of not more than 100 miles in diameter with a calm space of thirty miles! so as to make the zone of hurricane surrounding it only thirty-five miles in breadth. There is some countenance given to the idea that there really was a state of things approaching to this, from the fact that during the calm interval Capt. Burn, though evidently most attentive to his barometer, &c. only calls the sea "a very heavy swell." If the calm centre had been of the usual limited extent he would certainly have had somewhat of the dangerous confused pyramidal sea so often adverted to, and so well known to every sailor who has been through a China Sea Tyfoon, + that he never afterwards forgets to name it. The extent of the calm also accounts for the little sea found by the John Wickliffe. If these conjectures be correct, we have here a new class of circular storms which we might call Zonal, or Annulars, storms. And I venture to propose a name for them so early, merely for the purpose of calling attention to this singular peculiarity. The note in my Thirteenth Memoir, at p. 716, where Mr. Rechendorf describes the dust whirlwinds as a mere wall or zone of dust, will readily occur to those who have followed the subject. Mr. Thom speaking of the great storms of the

+ The Caledonia is a Bombay and China trader of 1000 tons, and Captain Burn, I have no doubt, has been in more than one Tyfoon.

<sup>\*</sup> Though these ought simply to have carried her to the Northern side of the calm centre: Northerly and even variable winds are not spoken of; perhaps an omission? for the log is seldom correctly kept in such weather.



Southern Indian Ocean, p. 201; says that "in the early stages it is probable the calm is very extensive and embraces several vortexes, which gradually merge into one," but it will be noted that we have here a "calm" of one-third of the whole space of the storm.

The centre for the 1st of December, we can only place by calculation, as to its probable position, between noon 30th, with the Caledonia, and 1 A. M., on the 2nd with the Hindoostan as calculated at p. 907, and assuming it to have travelled in a straight line. It would seem that the vortex expanded about this time, since it reached the Hindoostan, and being deflected or flattened, no doubt, by the high mountains of Ceylon, was with her not a NN. Westerly wind, which a true circle would require, but a Northerly wind which the coast hills would naturally produce. The warmth noted by Capt. Moresby, was probably the effect of the heated shores. At 1 A. M. on the 2nd, the Hindoostan was at the centre and steaming through the Eastern side of it! This ship's experiment, and I do not recollect that such a one has been performed before, gives us tolerable data for one important determination, which is the whole diameter of the vortex. The diameter of the calm space we cannot deduce from it, because she evidently steamed not through the middle, but through the Eastern edge of the calm centre.

If she had been far enough from the Ceylon shore for us to consider the Storm Circle as quite uninfluenced by the high land, our deductions would no doubt be more accurate. I have already noted that I make the storm arrows on the chart to form an oval and wavy, to represent this effect of the mountains, and that I consider the warm winds as coming from the heated shore, and that it is owing to this deflection that the *Hindoostan* had the wind North instead of N. Westerly, as she should, and probably would, have had it in the open sea.

We may consider her as entering upon the verge of the storm, at noon of the 1st when her barometer is at 29.71, and the gale seems fairly to have begun. From this time to noon the next day the log marks 135 miles of run, but the true distance is 110, which proportion we must use to calculate the distance run to 1 A. M. on the 2nd, when the wind "lulled suddenly, and shifted round to the Southward, and blew a perfect hurricane from the SE." Her run up to this time, then, is by log, seventy-one miles, but the correction above noted being the proportion of 135: 110:: 71: 58, reduces it to fifty-eight miles, which

we must take as the nearest approximation to the semi-diameter of the (somewhat flattened?) vortex, or 116 miles for the diameter; which agrees well with what we estimated it to be from the Caledonia's log. We further see by Capt. Biden's note, the extract from the Colombo Observer, and Mr. Higgs' valuable register, that while the centre was passing over Baticolo at about half-past two in the morning. (the calm focus there seems to have been quite small in extent,) it was blowing from the East in "most violent gusts," at Trincomalee, which is about sixty miles in a NNW. direction from Baticolo, which gives 120 miles of diameter for it on shore.

The Baticolo description remarks, indeed, that "the hurricane" did not extend to the country about the South extremity of the lake, which extends about twenty miles from the flag-staff; but by this phrase, the writer probably means that, although there was a gale, yet it was not as at Baticolo, a hurricane, levelling every thing before it. Places situated towards the Southern half of a Storm Circle, where it infringes upon high land, and comes straight in from the sea, should also be partially sheltered; while those on the Northern side (Trincomalee in this case). should feel its full force; because, if we follow the wind in its circuit, we shall see that the outer zones of it to the North-west, must be impeded by the high land. A centre at Baticolo giving a strong gale at Trincomalee, would extend sixty miles inland to the Westward, over a perfectly flat country; but the first mountain ranges of considerable elevation, certainly approach within twenty-five or thirty miles of the coast. I have endeavoured to mark this effect on the chart by the Baticolo circle of wind-arrows, making them wavy and broken as they skirt and turn off from the mountain ranges; noting, however, that this is merely to express my views of the probability of what took place.

The calm at the Basses is also accounted for by their being so completely sheltered and by their distance from the centre. The gales at Colombo are described as being, "brief though severe." They were possibly streams of wind forcing their way through defiles of the mountains? for the vortex if it continued entire above, must have been much divided and broken up below, and probably indeed "lifted up" by the very high land in the interior of Ceylon.

The Trincomalee report from Mr. Higgs requires some farther notice, its barometrical register giving it especially a high value. We find that

it had increased to "violent gusts" from NEbN.,\* the barometer being at 29 68, the strength of the wind being as 7.; and that at 2 p. m. there were "most violent gusts," the strength of the wind being 9., and the barometer still between 29.68 and 29.66, at which it stood at 6 A.M. It might no doubt have been found lower in this interval if observed, and it was at half-past two that the centre was passing over Baticolo.

Centre of the 2nd December .- We have now to follow the storm and assign a place for the centre on the 2nd December, bearing in mind that from Baticolo to Tuticoreen Roads is, in a straight line, 222 miles, with the high land of Ceylon between them. The centre passed Baticolo on the 2nd, at 21 A. M., and the Florist seems to have been wrecked in Tuticoreen Roads only about ten, or at most twelve hours later, that is in the night between the 2nd and 3rd. Hence this could scarcely be the same storm which had passed Baticolo, for if so, it must have, all at once, travelled at the rate of nearly eighteen miles an hour; and this notwithstanding the obstacles which the chain of Ceylon mountains must have presented. I am inclined then rather to suppose that this storm, which at or about midnight, 2nd and 3rd, was SE. at Tuticoreen; Westerly with the Faize Rubahny, between Cadiapatam Point and Cape Comorin; NW. with the Charles Forbes; a gale at Trevandrum, Quilon, Alleppy, Tinnevelly, and Ootacamund (no direction of the wind is given in the notes from these places); a "very violent gale" at East and SE. at Palamcottah; a "violent gale" at NE. on the morning of the 3rd at Cochin; and NE. and East, veering to SE. and SSW. at Cananore, at S A. M. to 1 P. M. on the 3rd. I am inclined to think then, that this storm was a new one, generated very possibly by the atmospheric disturbance to the East of Ceylon. The circle which I have marked on the chart then between Palameotta and the Faize Rubahny, may be supposed to be the average position of the centre of a new storm, at midnight between the 2nd and 3rd, as far as any place can be assigned to it with uncertain data, and in a mountainous country.†

By noon of the 3rd, we find the Charles Forbes with the wind, which had rapidly veered with her since midnight, S. Westerly with nearly fine weather. At Cochin at noon it was Southerly and S. Westerly, and

<sup>\*</sup> Advancing to the North beyond Baticolo, the high land trends farther inland to the West, so that the ceast being lower, less interruption was given to the vortex.

† See postscript.



it was moderating from SE. and SSW.; so that we may take it at this time to have been clear of the coast, and assuming that it extended from the Forbes' position at midnight, to near Cananore, it was now a storm of 240 miles in diameter; but this could not be the case, for whatever the Cananore gale\* was owing to the wind was S. Westerly, at daylight on the 3rd with the Charles Forbes, and N. Easterly at Cochin, and had left the Faize Rubahny; shewing that this vortex was of small extent, and that its centre lay between the Forbes and Cochin. I shall afterwards shew that the Cananore storm was probably that of the Juliana, Frances, and Morley.

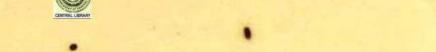
The logs of the ships John Brown and Mary Anne, which were to the Westward of, and between the Maldives and Laccadives, give us no traces of the Charles Forbes' storm on the 4th and 5th, except in a heavy swell felt by the John Brown; so that it may have broken up or exhausted itself in the tract between the coast and these Islands, or have travelled on to the positions of the Rajasthan and Monarch, on the 5th and 6th, which we shall afterwards consider.

We must now return to the Bay of Bengal again, to take up the storm experienced by the *Juliana*, *Morley*, *Myaram Dyaram*, and *Frances*, as having precedence in order of time.

We noted p. 905 that the Alibi in running up across the Caledonia's track, and nearly due North, between the meridians of 89 and 90°, experienced no bad weather, though some traces of the stormy action might be found in her log. It would appear that she had on the 29th in latitude 9° 8' North, heavy squalls and sea from EbN. and ENE. to South, and again to NE. after midnight, but nothing that could be called a severe gale, though her barometer was low, and she saw that the weather was threatening to the Westward on the 30th, when she was in about 12° North.

The Juliana clearly ran into a circular storm, having the winds first varying from NNW. to West, then to SW. and moderating for a time (which so frequently occurs) towards noon on the 28th, when she was always running on to the NW. She crossed the track of her storm behind or to the Eastward of its centre, and had a gale from the NE. obliging her to lie to, at 11 A. M. on the 29th.

<sup>\*</sup> The account it will be noted is a very loose one.



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We have no data for assigning any centre to this storm on the 28th, if indeed it was formed at this time, but we can only conjecture it to have been, if formed, to the North and NE. of her on that day. On the 29th, however, we may fairly say that her NNE. and NE. gale was part of a true vortex, and that the centre bore about SEbE. from her. We can only estimate, or suppose, a distance for it, and this a very limited one, for if a vortex of large extent it would interfere with the Storm Circle of the Caledonia. That it was not a part of the Caledonia's storm, I infer from the fact that the distance between the two ships (both their positions being well ascertained) is upwards of two degrees, and their difference of longitude very small; so that the NE. gale of the Juliana cannot be made part of the Caledonia's circle, without carrying this last to reach the John Wickliffe's track, and include her on the 30th, when she had fine weather and calms.

On this account then I have marked the Juliana's storm for this day, as a separate one, also of small extent.

On the 30th we have the Juliana with an Easterly gale moderating at noon, while the Morley, to the ENE. of her, has hers just beginning at SSW. and was undoubtedly running on to the WNW., being bound to Madras, so as to overtake the more central parts of the storm which gave her the shift of wind to the Eastward, and the half an inch fall in her barometer. We have unfortunately here again but a meagre memorandum, in which the position of the ship for the 29th and 1st are wanting, when these would have been of the greatest importance to our research.

Of the Myaram Dyaram's hurricane, all we know is, that she had the wind more Easterly than the Caledonia, and occasionally to the North of East.\* We know so little as to date and her position, that we are compelled, merely to suppose that it was on this day she had it most severely, and was in distress; one account (Captain Faucon) saying it was on the 1st, and another (Captain Twynham) on "the same day as the Caledonia," which would be the 30th, and her position gives the greatest probability to its having been on the 30th.† I have therefore placed the

<sup>\*</sup> Letter from Captain Twynham.

<sup>+</sup> Captain Twynham, and Captain Faucon both mention that the Myaram Dyaram, "a short time" or "a few days" before the gale fell in with a vessel from Moulmein.



centre of this storm for this day close to the Southward of the Myaram Dyaram, and have just included in it the position of the Frances, which ship was evidently on the Southern and S.Eastern verge of a storm, and as far as we can judge by her meagre note, ran up on its Eastern side. It will be noted also that her position on this day with a Westerly and S.Westerly gale reduces greatly the Storm Circle of the Caledonia, proving that it could not even have been of 100 miles in diameter.\* The fact of two small vortices so nearly parallel to each other is very remarkable, but the evidence for it appears to me, on this day especially, to be unquestionable, and if the Myaram Dyaram's storm commenced on the 28th, the two storms may have been also both formed on that date.

We have no farther trace of this storm after the 30th, and thus are uncertain if it broke up or amalgamated with the Caledonia's, Hindoostan's, and Ceylon storm, or if it continued its track farther as a small independent storm to the Coromandel coast, and crossing the Peninsula, forced its way through the Palgatcherry Pass, and produced the Cananore, Rajasthan's, or Monarch's storms in the Arabian sea?

We can only intimate, or consider that this might be possible, and the heavy storm at Ootacamund, which is twenty-seven miles North of the Palgatcherry Pass, and nearly three degrees North of the centre of the storm we have traced near Cape Comorin, lends some countenance to this view; for a small storm might easily have landed about Porto Novo, between Pondicherry and Point Calymere without any reports or accounts of it being taken or obtained. The threatening weather seen to the SE. from Madras might have been the outskirts of it.

We now return to the Arabian Sea. I have shown at p. 911 that the Charles Forbes' storm may have been broken up amongst the Laccadives, or it may have joined its force to that of the Cananore storm, and both together have formed that which the Rajasthan experienced from the 4th to the 6th. We have seen that at nooh the Charles

in distress, having no one to navigate her on board, and that she assisted her with an Officer and two Lascars. On her arrival at Point de Galle, two days after the Myaram Dyaram, it was found that she had fallen astern, and to the Northward of the Myaram, and though she felt the sea, had no violent winds. Her position being quite uncertain, we can only notice this.

\* The Caledonia might even on this day have been further to the Northward, as she

found on the 2nd that she was 50' North of account.



Forbes' storm was clear of the coast, and that at Cananore it was a gale on the 3rd, from 8 A. M. to 1 P. M. from NE., East, and SE., and that the ship Charlotte had no bad weather on the coast, being between Cochin and Cananore till the 4th; showing that this Cananore storm was of very small extent, and that the Cochin storm also did not reach much beyond that latitude. It is therefore more probable if the Rajasthan's storm came from the coast, that it was the Charles Forbes' travelling up in a NW. direction. Of the probability of this as to time and distance, we shall be better able to judge, when we have fixed the position of the Rajasthan's storm. That of the Monarch, which Captain Stewart supposes to have been the same, was evidently a different one, preceding that of the Rajasthan by fully eighteen hours.

It appears that on the 4th at 4 P. M., Captain Stewart observed a sudden fall of the barometer and sympiesometer, and that by noon of the 5th, the wind had increased to such a degree from the NW. that he judged it prudent to heave to, considering himself, as he observes in his note, in the South-western quadrant of a circular storm, which he no doubt was, and, from the sudden shifts, not far from the centre. have therefore assigned it a circle of eighty miles in diameter only, which will allow her to have been twenty-five miles from the centre at noon, and in so small a vortex this seems quite a sufficient allowance. I am indeed inclined to consider this storm as one which was of much greater extent above, than at the earth's surface, thus affecting the barometer from 4 P. M. of the 4th; but not of any great violence, since the ship was running on, though her Captain clearly understood his position, till 6 A. M. The circumstance of the barometer remaining so low, with gusts at times though the force of the wind had, as it proved, passed over, is an additional motive for our supposing that the vortex may have been of much greater extent above.

The Monarch's hurricane as I have remarked, was evidently earlier in time, though this ship was considerably to the N.Westward of the Rajasthan.

It is remarkable that the *Monarch* seems to have seen the vortex spreading overhead at 10 r. m. on the 3rd, when her symplesometer began to fall, and in three hours by 1 A. m. on the 4th, she had it blowing a complete hurricane, and at noon on that day she was at the centre of it. She laid to till 8 A. M. of the morning of the 5th, (the day of the *Rojasthan's* 

1845.]



or Cananore storm it will be remembered,) and then gradually made sail with the returning fine weather.

We can by no means positively connect these storms with those of the coast, though there is nothing impossible in their being connected, for taking the *Monarth's* to have been the Cananore storm, it must have travelled about 380 miles, or sixteen miles an hour, in the twenty-four hours between the 3rd and 4th, a rate at which no doubt our storms frequently do travel, and its rapid approach to the ship shews that it really was moving fast. It did not quit her so soon as it might be expected it would do, because she was for a time apparently blown round the circle, and thus drifting with the storm.

The Rajasthan's storm may be supposed to have been that of the Charles Forbes, without assuming any high rate of motion, for, as we have shewn, that vortex was just clearing, or clear of, the land by noon on the 3rd, when it would require only to travel about 300 miles in two days, or 150 miles per day, or a little more than six miles per hour to reach the Rajasthan.

### Conclusion.

We are much struck when considering these remarkable small storms with their close analogy to what we see of water-spouts at sea, and with dust-whirlwinds on shore, which so frequently seem to move on in pairs or threes along the same paths: and yet withal, diminutive as we may comparatively term them, they seem to have been, for the Myaram Dyaram, Caledonia, Hindoostan, and the unfortunate station of Baticolo on the East side of the Peninsula, as well as with the Monarch, and nearly with the Rajasthan, of true hurricane, or rather considering them as to size, Tornado violence. They thus become, from the short warning which they afford, even more dangerous than storms of greater extent, which allow of twelve to twenty-four hours for preparation; and while they add a new page\* to our

<sup>\*</sup> Though not wholly an unexpected one. See X. Memoir. The Coringa Packet's and H. M. S. Centurion's storms off Ceylon; Journal Asiatic Society, Vol. XIII p. 113.

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knowledge of Indian hurricanes, they give, as every successive investigation seems to give, a new lesson to the seaman which he has only to profit by.

The regularity with which, in spite of the mountains of Ceylon and of Southern India, they seem to move on, in about the average track is also remarkable.

Postscalet.—While this paper is going through the press I obtain the log of the Barque Victoria, Captain Hyde, which ship on her voyage from Calcutta to Bombay, had from let m. of the 2nd, and morning of the 3rd December, a heavy gale from the North to NW. and SW., but which abated by 9 A. M. At 6 P. M. of the 2nd Quilon Fiag-Staff bore NAW.; and at noon on the 3rd, the latitude was 8° 31' North, by observation. This ship was therefore a little to the north of the Charles Forbes' position, and proves our estimation of that storm as marked by the outer arrow to be correct.—H. P.

Proceedings of the Asiatic Society of Bengal, December, 1845.

The stated monthly meeting of the Society was held on Wednesday evening, the 3rd of December, T. W. Laidley, Esq., senior member present, in the chair.

The following members proposed at the last meeting were ballotted for and declared duly elected.

J. Christian, Junior, Esq., Monghyr.

W. Taylor, Esq. B. C. S.

Augustus Wattenbach, Esq.

Donald Mackey, Esq.

Ensign F. W. Ripley, 22nd N. I.

L. C. Stewart, Esq. M. D. Assistant-Surgeon, H. M. 39th Foot.

W. Theobald, Esq. Barrister at Law.

T. C. Jerdon, Esq. M. D. Madras.

And the following new member was proposed:

Walter Elliott, Esq. Madras C. S., -proposed by the Secretary, seconded by the President.

The proceedings of the meeting of November were read and confirmed.

Read the following list of books, presented, exchanged, and purchased:—

List of Books received for the Meeting of Wednesday, the 3rd December, 1845.

PRESENTED.

1. Tijdschrift voor Neerlands Indië. Zesde Jaargang, Batavia, 1844, 12 Nos. Zevend Jaargang, 1845, 8 Nos.—By the Batavian Society.

 Natuur-en Geneeskundig Archief voor Neerlandsch Indië Eerste Jaargang, Batavia, 1844, 4 Nos. Tweede Jaargang, 2 Nos.—By the Society.

3. Verhandelingen van het Bataviaasch Genootschap, Volumes 1st, 5th, 7th, 8th, 11th, 12th, 15th, 16th and 17th, Nos. 2 to 7, Vol. 20th.—By the Society.

4. Korte Beschrijving van het Zuid-Oostelijk Schiereiland van Celebes, door J. N. Vosmaer.—By the Society.

Nederduitsch en Maleisch, en Maleisch en Nederduitsch Woordenboek, door P. P.
 Roordavan Eysinga, Batavia, 1824-1825, 2 Vols.—Bysthe Society.

6. Catalogus Plantarum in Horto Botanico Bogoriensi Cultarum Alter. Auct. J. C. Hasskarl. Bataviae, 1844.—By the Society.



- 7. Islandick Almanac, two copies, by B. Kamphövener, Esq.
- 8. Danish Almanac, two copies, by B. Kamphövener, Esq.
- 8. Danish Spelling book, two copies, by B. Kamphövener, Esq.
- 10. Della Famiglia Filologica delle Metonimie Arabe, by J. V. Hammer Purgstall, Milano, 1844.

#### ADDITIONS.

11.

- 12. Turjama Tul Lazim, Arabic. Presented by H. Torrens, Esq.
- 13. La i Hotul Fala Letalimuzoarat, Arabic .- By the same.
- 14. Ussul-Handaza, Arabic.-By the same.
- 15. Al-Jyharul-Badia, Arabic.—By the same.
- 16. Adad Ansah, Ambic. By the same.
- 17. Taribatus Saphia, Arabic .- By the same .
- 18. Meteorological Register for September and October, 1845, from the Surveyor General's Office.
  - 19. Calcutta Christian Observer, November, 1845.-By the Editors.
  - 20. Oriental Christian Spectator, No. 11, November, 1845 .- By the Editor.
- London, Edinburgh, and Dublin Philosophical Magazine, third series, No. 177,
   July, 1845.—By the Editor.
  - 22. Journal of the Royal Asiatic Society, No. 16, part I. 1845.—By the Society.
  - 23. Journal Asiatique, 4me. Série, Tome 5, No. 23, 1845.
- 24. Report of the 14th Meeting of the British Association for 1844. London, 1845, 1 Vol.—By the Association.
  - 25. Bullétin de la Société de Géographie, Tome 2nd, 1844.—By the Society.
- 26. Annales des Sciences Physiques et Naturelles de Lyon, Tome 7, 1844.—By the Royal Agricultural Society of Lyon.

#### EXCHANGED.

- 27. Journal of the Agricultural Society of India, Vol. 4, part 3.
- 28. Athenaum, Nos. 932 to 935, for 1845.

#### PURCHASED.

- 29. Annals and Magazine of Natural History, No. 104,-September, 1845.
- 30. Journal des Savants, Avril, 1845.

The Secretary stated that in reference to the enquiries directed to be made as to the sales of the Society's publications likely to be effected at Agra by the Rev. Mr. Moore, the Sub-Secretary had received from that gentleman a note shewing that the total sales effected by the School-Book Society of Agra, in 1844, were:

· ·· Tota	l	1,361	6	0
Persian,		197	14	0
Arabic,				
Sanscrit books,	Co.'s Rs.	1,124	12	0



An amount which will no doubt be extended with a larger stock from which to choose.\*

The Secretary laid before the Society the model of an iron rail, which he suggested might be advantageously put up in lieu of the brick wall which now separates the premises of the Society from Park Street. This alteration would he observed greatly improve not only the appearance of the Museum, but also that of one of the principal thoroughfares of the European quarter of the city. He laid before the Society an estimate at an extremely low rate, and proposed that the cost should be met by subscription.

The putting up of the iron rail was approved by the meeting, and the mode of having the work performed referred to the Secretary for further arrangements.

The Secretary, in fulfilment of his promise to report, with reference to the purchase of certain standard books, upon the funds of the Society, now stated that the amount to credit was Rs. 12,800 in Government securities; but that in addition the Society had a claim on the estate of the late Csoma de Korosi for Rs. 5,000 left to it by him. This bequest had been challenged by persons, Austrian subjects, representing themselves as his relatives, and the monies had been paid over to the Registrar of the Supreme Court; as however three years had elapsed without any rejoinder to the reply of the Society to that challenge, he suggested that the money should be claimed provisionally on its behalf, security being given for the amount; this would leave the Society with Rs. 5,000 for a commencement of the purchase of the books alluded to, in addition to the charges entailed by certain forthcoming Nos. of the Transactions, Dr. Hæberlin's Sanscrit Anthology, and other charges.

The proposal to apply for the legacy, giving security for the amount, was agreed to.

The following resolution was hereupon moved by the President, seconded by J. Ward, Esq., and carried unanimously.

The funds of the Society being reported at 12,000 Rupees, and the claim on the estate of the late Csoma de Korosi being for 5000 now in the Registrar's hands, it is proposed to demand payment, on security, of the said 5000 Rupees, for purposes immediately connected with the pursuits of the Society, instead of (at this moment) breaking in on our funded money.

Lists of the Asiatic Society's Works in Hindi, Nagree, and Bengalee, are in preparation by order of the Secretary, and will be widely circulated.—Ens.



The Secretary reported that the staircase having been attacked by white ants, he had deemed it necessary to have the casing stripped off, and as a part of it was sinking he had farther, under the advice of Colonel Forbes and Mr. Mornay, had it properly raised; but as the placing of an Iron-pillar for support at each angle would have been expensive he had at the suggestion of the Sub-secretary and with Colonel Forbes' approval, taken two of the sandstone Hindoo Pillars from the portico, to use as props, for which they answered perfectly and were not the less favourably exhibited as antiquities.

Read the following letters from the Secretary to the Government of India:

No. 2821 of 1845.

FROM G. A. BUSHBY, Esq., Offg. Secretary to the Government of India.

To H. TORRENS, Esq., Vice President and Secretary Asiatic Society, of Fort William. the 15th November, 1845.

FOREIGN DEPATMENT.

SIR,-I am directed to request that you will convey to the Asiatic Society the thanks of His Honor the President in Council for the 100 copies of Lieutenant Postans' translation of the Toofut ul Kiram, a history of Scinde, which accompanied your letter of the 7th Instant to my address.

G. A. BUSHBY,

Offg. Secretary to the Government of India.

Fort William, the 15th Nov. 1845.

Read the following letter from the Secretary to the Araratian Society : \_

H. Torrens, Esq., Secretary, Asiatic Society.

SIR,-I am directed by the Committee of the Araratian Society to own receipt of your letter of the 20th ultimo, and to request your acceptance of their united acknowledgments for the valuable gift accompanying your said letter, as likewise for your having kindly inscribed our Society for the future copies of your Journals.

P. J. SARKIES,

Secretary, Society of Ararat,

Calcutta, 11th Nov. 1845.

The Secretary intimated that he had received two private letters from Lieutenant Fletcher Hayes informing him that he was busy in carrying into effect his intention of publishing a grammar and vocabulary of the Belocchee language, &c. &c.

Read the following letter.

To the Secretary of the Asiatic Society, Calcutta.

My DEAR SIR,-Permit me to solicit your kind assistance. I believe as far back as 1834 a paper was published by Mr. G. A. Prinsep regarding the introduction of steam navigation into India.



## DEC. 1845.] Proceedings of the Asiatle Society.

This publication contained valuable and interesting matter relating to the peculiarities of the Ganges, combined with that of Rennell and Colebrooke.

I am given to understand the information is to be found in the Journal of the Asiatic

Society published in Calcutta.

If I may beg the favour of your procuring, if in your possession, a copy of the same I should feel infinitely indebted—or where it may be obtained.

Your obedient servant,

W. FENNER,

Comdg. E. I. C. Steamer Conqueror, Indus Flotilla.

E. I. C. Steam Vessel Conqueror, Sukkur, November 4th, 1846.

The Secretary stated that neither himself nor the Sub-Secretary had been able to procure the work alluded to.\*

Read the following papers :-

Extract of a letter from Lieut. Blagrave, B. I., to the Sub-Secretary, dated Kurrachee, 16th October, 1845.

"Accept my best thanks for the papers on Scinde, and for the trouble you took in getting the works on Conchology for me. We are getting up an Association here to collect information, &c. &c. about the country; I enclose an account of the first meeting. By and bye I hope we may be able to publish papers, but at present we are only to make collections of books, coins, fossils, &c. Can you tell me whether the whole of the Journal of the Asiatic Society is procurable in Calcutta? we want to get it, and as many other works containing notices relative to Scinde as possible."

SCINDE ASSOCIATION.

At a meeting held in the house of Captain Preedy, on the 9th October, the following gentlemen were present:—

His Excellency Sir Charles Napier, in the chair.

Colonel Douglas.
Captain J. Napier.
Captain Browne,
Doctor Gibbon.
Lieutenant Blagrave.

Captain Preedy.
Captain W. Napier.
Captain Byngs
Lieutenant Masters.
Lieutenant Mayor.

Ensign Burton.

John Macleod, Esq. Ensign Burton.
and a series of resolutions forming the bodies of the future Rules of the Association were
passed.

1st. That an Association be formed at Kurrachee, for the purpose of collecting information concerning the Natural History, Antiquities, Statistics, Dialects, &c., of Sindh, and the adjacent countries; and that it be denominated the Sindh Association.

2nd. That the Sadh Association shall consist of Members, and that any individual of whatever rank or service desirous of joining the Association, shall intimate the same to the Secretary.

3rd. That His Excellency Sir Charles Napier be sequested to become the Patron of the Association.

A copy has been since obtained.

4th. That Colonel Douglas be requested to become the President of the Association. 5th. That the five following gentlemen be requested to form the Committee at Kurrachee.

Captain Preedy. Captain Browne. Captain J. Napier. Lieutenant Blagrave.

John Macleod, Esquire.

Ensign Burton, Acting Secretary and Treasurer.

6th. That for the general purposes of the Sindh Association, -viz. purchasing books and coins, sending out proper persons to collect specimens of Natural History, &c., &c., a monthly subscription of five Rupees, to be reduced next meeting to two Rupees or one, be paid by each Member, in addition to a donation of twenty Rupees on entrance.

7th. Captain Preedy having kindly offered to place at the disposal of the Association one of the rooms in the new School-room built by him in the neighbourhood of the Town, it is proposed that his offer be accepted as a temporary measure, but that means be taken for raising Funds to erect a building to be devoted solely to the purposes of the Association.

8th. That with respect to the Library, the books to be purchased shall consist of works relating to Sindh, and the adjacent countries, especially to History and Antiquities, also that Scientific works and books of reference be provided for the use of the Members.

That every member be requested to favour the Secretary with any information 9th. upon the proposed objects of the Society. Any donations of books, specimens, &c., &c., will be most thankfully received.

10th. That the expense of transmitting all communications be defrayed, if desired, by the Society.

11th. That the Secretary register all papers, and donations, together with the names of the donors, and enter in a book to be kept by him, all miscellaneous and detached memoranda with which he may be favored.

12th, That Quarterly General Meetings be held, and that intermediate meetings also may be called for by the committee, or at the requisition of any five Members.

13th. That the committee now elected be requested to frame, and submit a series of regulations to the next meeting of the Association.

A General Meeting of the Sindh Association will take place on the 8th of November, 1845.

R. BURTON, Acting Secretary and Treasurer.

At a previous Meeting held at the house of Captain Preedy, on the 9th October, 1845, a series of resolutions, forming the basis of the future rules of the Sindh Association were passed. In conformity with Par. 13 .- "That the Committee now elected be requested to frame and submit a body of By-laws to the next meeting." At a general meeting of the Association held at the house of Captain Preedy on Saturday the 8th November, 1845. The following By-laws were proposed and passed.

Present.

Colonel Douglas, Captain Napier. Captain Preedy.

Captain Young. Captain Hughes. Dr. Gibbon-

Lieut. Blagrave. Lieut. Maclagan. Lieut, Vanrenen.

1st. This Association, as established mainly for the purpose of collecting a Library of reference, and recording information relative to Sindh,—its Natural History, Antiquities, Statistics, Dialects, &c, shall be denominated the Sindh Association.

2nd. The Association shall consist of Members and Subscribers.

3rd. Any individual, of whatever rank or service, desirous of becoming a member of the Sindh Association, shall intimate the same by letter to the Secretary; upon which he shall be proposed at the next monthly meeting of the Committee of Management, and after securing a majority of votes in his favour, shall be duly elected.

4th. All members, resident, or non-resident, shall upon election either pay a Life Composition of Co.'s Rs. 80, or an Entrance Donation of Co.'s Rs. 25, together with a

monthly subscription of Co.'s Rs. 2.

5th. Subscribers shall enjoy the same privileges as members except the rights of voting at General Meetings, being elected members of the Committee of Management, or holding any office whatever in the Association.

6th. Any individual, of whatever rank or service, desirous of subscribing to the Association, shall intimate the same by letter to the Secretary, forwarding the sum of Co.'s

Rs. 6-his subscription for the current quarter.

7th. Life Compositions and Entrance Donations shall be paid upon joining the Association, monthly subscriptions shall be paid 3 months in advance by all members and subscribers, resident or non-resident, upon the first days of January, April, July and October.

8th. General Meetings of the Members and Subscribers shall take place Quarterly, upon the second Mondays of January, April, July and October, at which times the Secretary's and Treasurer's accounts shall be audited, lists of purchases presented by the Committee of Management inspected, the committee and office-bearers elected or renewed, and alterations and emendations of the present By-laws of the Association put to the vote-

9th. The office-bearers of the Association shall consist of a President, a Vice-President, a Secretary and a Treasurer.

10th. The President shall preside at the Quarterly General Meetings, conduct the proceedings, and give effect to the resolutions.

11th. The Vice-President of the Association shall preside at and record the proceedings of the monthly meetings of the Committee of Management, conduct the correspondence of the Association, suggest plans for attaining its objects, and in general aid the Secretary in promoting the purposes of the Association.

12th. The Secretary who shall be, ex-officio, member of the Committee of Management, shall superintend all persons employed by the committee to collect such books, coins, and specimens of Natural History as may be required by the Association, and shall lay a detailed list of the same before the Quarterly General Meetings.

He shall register in a book to be kept by him for that purpose, all papers and donations with which he may be favored, superintend the correspondence, and prepare such notes and memoranda as he may judge fit to be submitted to the quarterly general meetings, previous to publication. He shall also assist the Treasurer in preparing quarterly reports of the progress of the Association.

13th. The Treasurer shall superintend every thing connected with the receipts and expenditure of the Association, directed by the committee of management, and submit to

every quarterly general meeting a report and summary of all subscriptions and donations received by him through the Secretary, together with the payments made out of the funds of the Association.

14th. The Committee of management shall consist of at least five resident members of the Association elected and renewed annually upon the first Monday of every January. The Committee, of which any three members shall be a quorum, shall meet upon the first Monday of every month, at which meetings members shall be elected, and notes and memoranda intended for publication, be inspected previous to laying them before the Quarterly General Meetings of the Association.

15th. Any three office-bearers or members of the Association desirous of assembling the Committee of management within the stated regular periods, shall intimate the same by letter forwarding heir reasons to the Secretary, and the Committee shall be duly warned by the latter to meet upon the day proposed.

16th. Any member or subscriber, desrious of withdrawing his name from the Association, shall declare the same to the Secretary, at some time before the first days of January, April, July and October. All subscriptions paid in advance, shall be forfeited upon withdrawing from the Association.

17th. The expense of transmitting all communications and donations of books, coins, and specimens of Natural History, shall, if it be desired, be defrayed by the Association-

Subjoined is the amended list of the office-bearers previously elected by the members of the Sindh Association at the General Meeting held upon the 9th October, 1845.

> Patron-H. E. Sir C. Napier. President-Colonel Douglas. Vice-President-Captain Preedy.

Committee of Management for the year 1845.

Captain McMurdo. Captain Browne.

Doctor Gibbon.

J. Macleod, Esq.

Ensign Burton.

Captain J. Napier.

Captain Hughes. Lieutenant Blagrave.

Mr. Sparks.

Honomery Secretary-Lieutenant Maclagan.

Treasurer-J. Macleod, Esq.

The Donations or Life Compositions and Subscriptions for the current quarter (Rs. 6) are requested to be paid to the Treasurer.

> R. BURTON, (Signed) Acting Secretary.

Camp Kurrachee, 10th October, 1845.

Memorandum by the Sub-Secretary, Asiatic Society.

In submitting the accompanying notice of the Scinde Association, together with an extract from a letter to him from Lieut. Blagrave, a zealous contributor, the Sub-Secretary begs to suggest for the consideration of the Secretary and Committee of Papers:

1. That the Asiatic Society may be able to give great aid and encouragement to its fellow-fabourers in this new and promising field, while it derives also itself no small benefit, and that this may be accomplished at a perfectly trifling expense.

2. He proposes then that the Asiatic Society offer to the Scinde Association to print any contributions which the Editors of the Journal and the Committee may approve of,



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as if such were part of its own contributors' labours, reserving always the full right of selection, time, preference, &c.

- 3. And that it will forward to the Scinde Association copies of every paper so published in the Journal, keeping up for them a regular series of paging in their over-copies, so as to give them a regularly paged series or volume which they may afterwards entitle and index as they please.
- 4. As there is no press in Scinde, and printing and lithographing are far more expensive at Bombay than here, it is probable that for a long time the Scinde Association may be much checked in its useful labours by this difficulty; for few will write without the hope of publication, and the Asiatic Society can grant this aid with positive benefit to itself. While also, it should be noted, the Scinde Association will perfectly preserve its own independence, and obtain for all its working members their one share of credit and encouragement.

H. Piddington. Sub-secretary, Asiatic Society.

Museum, 11th Nov. 1845.

Note.—The Secretary begs strongly to support this proposal which is in his opinion a very happy one, and highly expedient. He also begs permission to forward the back copies of the Journal from the 1st January 1845, and to continue its Transmission gratis to the Scinde Association.

W. P. and Secretary, Asiatic Society.

The Sub-Secretary further begged to propose that the Journal, as far back as in the possession of the Society, be presented to the Scindian Association.

These proposals as recommended by the Secretary and approved by the Committee of Papers, was carried unanimously.

The following letter was addressed to the Scinde Association and is inserted here for the sake of connection:—

## The Secretary to the Scinde Association.

Sin,—I am desired to express to you the high gratification with which the Asiatic Society of Bengal has learned, by a communication from Lieutenant Blagrave to its Sub-Secretary, the establishment of the Scinde Association, and its desire to co-operate in every way with the labours of the gentlemen composing it who have before them so interesting a field.

2. And, as the best proof of this desire, I am directed to inform you that the Society at its meeting of the 3rd instant have unanimously adopted the proposal annexed, which it trusts will be agreeable, and afford most efficient aid to your efforts, and further that I

\* Were we even to reject a paper sent to us, we could have it printed here for the Scinde Association and paged into their series at their expense or that of the author.

am instructed to forward to you a set of the Journal of the Asiatic Society, as far as available from our stock by such route as gou shall direct.

With our best wishes for the prosperity of the Scinde Association,

I am, Sir,

Your obedient servant,

H. Torrens.

Museum, 5th Dec. 1845.

V. P. and Secretary Asiatic Society.

Read the following letter from Lieutenant Baird Smith to the Sub-Secretary :-

H. PIDDINGTON, Esq.

My DEAR PHOINGTON,-I send you herewith another disquisition on earthquakes. being the register for 1843, somewhat in arrears, but this cannot now be avoided, my spare time being so limited. 1844 was so quiet that there are not above four or five shocks to record, so I will combine it with 1845 and send both at once. Part IV. of the Review, which completes it, I must try and sendeyou soon, it will be but a short one, and if I could only get a clear week's work at it, I would soon get clear of it.

I have found nothing at old Kerlsea worthy of the notice of the Society, old iron knives much worn, with stones, and fragments of pottery, pieces of silver bangles, with other indications of the spot having been the site of an old town or village have been met with, but among them none worthy of preservation or transmission to Calcutta.

Your's, &c.

Camp Sahabidpoor, Doab Canal, 10th Nov. 1845.

BAIRD SMITH.

The Secretary stated that the paper had been sent to press, and would appear in No. 164 of the Journal now forthcoming.

Read a letter from Dr. Campbell, Resident, Darjeeling, as follows:-

H. PIDDINGTON, Esq.

My DEAR MR. PIDDINGTON,-I have the pleasure to send you copy of a letter addressed by me a long time ago to the Secretary of the Society, but which has unfortunately been mislaid. The document which accompanied my letter, and which is alluded to in it, was one of much interest I think, bull did not, I regret to say, keep any copy of it.

Will you do me the favor to inform the Secretary that the tablet forwarded by him for the monument of the late Csoma Korosi, safely reached me at Darjeeling, and was put in its place."

Your's truly,

A. CAMPBELL, M. D.

Read the following letters:-

To the Secretary of the A latie Society of Bengal.

SIR,-Enclosed we have the pleasure to wait upon you with Bill of Lading for 4 cases and I stuffed snake, shipped to your address per Fire Queen. These, together with the enclosed letter, were delivered to us by Captain Vander Brooke, of H. N. M. Steamer " Brome" on the 5th ingant, with a request to have the same forwarded to their destination. As we have no further instructions regarding them, and know nothing of the

See Proceedings, February, 1845.

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intrinsic value of the contents of the cases, (which we believe contain specimens of Natural History,) we do not effect insurance. Such being the nature of the packages, we wave with much pleasure the charges incurred in forwarding the same, as we understand they come from the Asiatic Society of Java.

Your's, &c.,

Singapore, 24th Oct. 1845.

A. L. JOHNSTON AND CO.

A Monsieur le Vice Président et Secretaire de la Société Asiatique de Bengale.

Monsieur !—C'est avec un vif plaisir, que la Société des Arts et des Sciences de Batavia a reçu la lettre du 3 Juin, 1845, dont vous avez bien voulu m'honorer, et l'envoi des volumes des Transactions et du Journal mensuel de votre honorable Société.

En me pressant de vous témoigner la parfaite satisfaction de notre Société sur ce qu'elle vient de recevoir, j'espère de même satisfaire au desir, expriné dans la susdite lettre et dans la note de Mr. Blyth qui l'accompagnait, en vous offrant tout ce dont je puis disposer pour votre Musée.

J'espere qu'il vous sera agréable de recevoir tous les arrière-volumes, disponibles, de l'ransactions de notre Séciété, dont notre membre correspondant Mr. Melvill de Carnbée ne vous a pas encore fait l'offerte. Vous trouverez ci joint les volumes I. V. VII. VIII. X1. XII. XV. XVII. XVIII. et XX. Prochainement nous aurous l'honneur de cous faire parvenir le volume XXI. dont la publication se trouve un pen retardes.

Les livrès classiques de litterature Orientale, que votre Société a publiée, seront de caucoup de prix aupres de nous, surtout parce que nous nous occupons maintenant principalement avec la litterature Javanuise et qu'il y a beaucoup de rapports entre celle et la litterature ancienne du continent de l'Inde.

Un exemplaire du catalogue de notre collection Archæologique, qui en ce moment sous presse, vous sera transmis, incessament après que ce travail sera achevé.

J'ai l'honneur de vous offrir ci joint un exemplaire d'un journal, que je publie depuis sept ans, et qui est voué à l'ethnographie, l'archæologie, la litterature, etc. de l'archipel Indièn.

Nous le regrettons infiniment, de n'être plus dans l'occasion de vous faire des encous considérables pour votre Musée d'histoire naturelle. Depuis 1843 plusieurs
causes ont contribués à la suppression de nôtre Musée Zoologique. Tous les echantillons
remarquables ont été offerts an Musée Roya d'histoire naturelle de Leide, et tous les
mores, y compris ceux d'une mauvaise conservation, ont été vendus. Cette suppression
nous la regrettons d'autant plus, qu'elle nous empêche de vous faire l'offerte des Mammitéres et des oseaux de l'Archipel Indièn, qui, nécessairement d'une haute importance pour vos galleries Zoölogiques, nosont que d'un interét subordonnée pour le Musée
moi de Leide, qui possédait dejà des echantillons de toutes les espèces, avant notre
tentier envoi. Ce qu'il nous reste encore, quoique peutêtre de tres peu d'importance
pour vos galeries, nous vous l'envoyons, comme témoignage de nos vœux sincères,
autont d'être utile à votre Institution, que de profiter nous même, pour la notre.

Dans une des caisses ci jointes vous trouverez quelques espèces de Cheiroptères de l' de Java et plusieurs espèces d'oiseaux de l'Auchipel Indièn. Les Cheiroptères apportieusent, comme vous pourrez voir, aux genres Pteropus, Rhinolophus, Dysopes, etc. Le biseaux aux genres Falco, Buceros, Coracias, Sparactes, Muscicapa, Saxicola, Sylva, Fringilla, Parus, Hirundo, Cypselus, Podargus, Alcedo, Dacelo, Merops, Dicaum, Nectarinia, Picus, Psittacus, Bucco, Trogon, Centropus, Perdix, Columba, etc. Quoique plusieurs de ces échantillons sont d'une mauvaise conservation nous ne doutons nullement, qu'ils ne vous spient agréables.

Dans une autre caisse nous avons fait emballer une tête osseuse d'un Rhinoceros de Java, capturé dans les forets de plateau de Bandong.

Une quatrième caisse comprend des échantillons de quelques mammifères, notamment d'un Sténops de Java, de trois spèces de Sciurus, d'un Hylogale, d'un Moschus Java. nicus, d'un Lepus mélanauchen, d'un Manis, etc.

Une cinquième caisse enfin comprendra une tête ossense d'un Crocodilus biporcatos de Java, et puis quelques reptiles Cheloniens de Java.

Ce que nous venous de vous offrir, nous n'ignorons nullement, qu'il ne fait qu'un partie tres mince des désiderata, notés sur la liste de Mr. Blyth ; mais nous osons nous flatter, que biento MM. les Naturalistes, membres de notre Société, nous mettrent même de vous offrir des envois plus considérables et mieux conservés.

l'honneur d'être-

Votre Serviteur devoué.

VAN HOEVELL.

President de la Societé des Arts et Sciences à Batavie

Batavià, ce 28 Septembre, 1845.

- The Secretary noted here that no reply had been received from the Batavian Society to his first communication forwarding a list of deal derata in the Geological and Mineralogical departments, which had be sent long before the letter here replied to. (See Proceedings of Man last).

The Secretary stated that in reference to the purchase of the Kamoo one of the Arabic works desired by the Royal Academy at Christians he had found that a good copy of Mr. Lumsden's edition of that work could not be procured for less than 150 Co.'s Rs. He had therefore referred to Capt. Bonnevic, R. N. N. for his advice before incurring this high charge, and, all things considered, had thought it best to send for the present the Persian Translation, which could be procured for 30 or 35 Rs., and await the farther orders of the University of Christiana.

Read the following letter from Walter Elliott, Esq., Madras C. S.

. H. Tonnens, Esq.

My DEAR TORRENS,-When I was at Guntoor the other day I wrote to you for old Col. McKenzie's plans, &c. of Amarawatty, which Mr. Piddington kindly sent to me. afterwards made some interesting excavations on the same site, and succeeded in laying open the foundations of the magnificient debgope which McKenzie saw in a much more perfect state, but still too imperfect to enable him to understand its plan or shape. In digging out one of the gateways, I came upon some overthrown figures of men and animals, statues, that had ornamented parts of the entrance, and which I found represented in relief on some of the sculptured ornaments of the building which I also dug



Guided by this clue I made a plan of the whole, which I have filled up with such details as the sculptures afforded. I think however I should be able to do this much more completely if I had McKenzie's drawings to refer to, and I want you now to try and get me the loan of the Vol. of drawings in the Asiatic Society's Library containing McKenzie's sketches of Amarawatty. I should be able to do all I want in the interval between two steamers, so that if you would send it by one it should be returned by the next.

The style of architecture in this building is totally different from anything Indian I have ever seen, and is probably that of the early Buddhists. All the subjects relate to Buddhist mythology, and the characters of the inscriptions are those of the 3d century, B. C. But the inscriptions themselves are short and otherwise unimportant. So few monuments of that age are extant, and the style of this one is so peculiar, that I think it is highly important to investigate the subject fully. The remains of the spot are now described, the inhabitants removing every bit of marble that appears to burn it into lime, and to one will have the same opportunities that I had to form a guess at the form of the original construction.

I wish you would get me elected a member of your Society. I never get the Journal will be supposed in the publisher would forward the medicant I supposed.

I have got three boat-loads of the sculptures, excavated by me coming down by sea Masulipatam, which I mean to deposit in the Museum here, but as there will be one than can easily be stowed away. I would send you a few specimens if you like it.

Madras, Nov. 3 1845.

Your's, &c. Walter Elliot.

The Secretary stated that he had, on his own responsibility, forwardthe volume desired to Mr. Elliot.

Read the following letter from Dewan Neel Ruttnu Haldar, of the

HONORED SIR,—To-morrow being the first Wednesday of the month, I beg to submit the fur copy of the Kódanda Mandan, the treatise on Archery, of which I took the liberty showing you the original. If the Asiatic Society should like to give this work room their valuable Library I shall be most hoppy to make them a present of it.

Your's, &c. NEEL RUTTON HALDAR.

The Secretary presented on the part of Mr. K. the following coins and Danish Antiquities for the Museum

Coins and antiquities presented by The Royal Society of Northern Antiquaries, through

Mr. Kamphovener, 3rd December, 1845.

- 1. A silver coin of Ahmed ben Ismail, (A. D. 907-913). Samarcand.
- 2. A D. D. of Naso ben Ahmed, (A. D. 913-943). Samarcand, 302, (A. H.)
  Both coins were found in Denmark!
- 3. A Set of the coins of Christian 8th, four silver and eight copper coins.
- 4. Three Danish copper coins from Tranquebar.

- 5. Four Swedish copper coins. Carl Johann, XIV.
- A copper coin from Madeira. Maria II. D. G. Port. et Alg. Regina, 1842.
- A Scandinavian spiral brass armlet.
- 8. A stone axe.
- 9. A ditto in an unfinished state.
- Two stone knives. 10.
- A ditto with handle. 11.
- Four stone fragments, (chips.) 12.
- A stone chisel. 13.
- 14. A brass chisel (called palotaff) Angl. Celt.

REPORT OF THE CURETOR OF THE MUSEUM OF ECONOMIC GEOLOGY AND DEPART-MENTS OF GEOLOGY AND MINERALOGY.

We have received so little this month, and I have been so much occupied with laboratory pursuits that my report will be very brief.

Geology and Mineralogy.

Messrs. Weaver have sent us three large specimens of fossil wood, but as yet without note of their locality.

Museum of Economic Geology.

We have received the following letter from Government, with the map to which it relates.

No. 985.

FROM THE UNDER-SECRETARY TO THE GOVERNMENT OF BENGAL, TO THE VICE-PRE-SIDENT AND SECRETARY, ASIATIC SOCIETY.

REVENUE.

Sin,-I am directed to forward, for the use of the Museum of Economic Geology, the accompanying Map of the Central Division of Cuttack, in fifteen parts.

A. TURNBULL,

Under-Secretary to the Government of Bengal.

Dated, Fort William, 26th Nov., 1845.

As also the following announcing that the Coal and Iron Committee being dissolved, the collections, office furniture, and records are to be transferred to the Asiatic Society. I have seen Dr. McClelland on the subject, and when the transfer is effected shall be able. duly to report on it.

No. 3089.

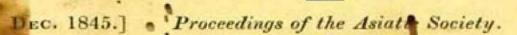
FROM THE UNDER-SECRETARY TO THE GOVERNMENT OF BENGAL, TO THE SECRETA-BY TO THE ASIATIC SOCIETY. .

SIR,-I am directed to forward, for the information of the Asiatic Society, the annexed Lr. of 10th Nov., 1845, from Secretary copies of correspondence as per margin, with the late Coal and Iron Committee. Coal Committee. Lr. No. 3088, of 29th, do. to do. do.

A. TURNBULL,

Under-Secretary to the Government of Bengal

Dated, Fort William, 29th Nov., 1845.



(Corres.)

To F. J. HALLIDAY, ESQ. SECRETARY TO THE GOVERNMENT OF BENGAL, ETC.

Sin,—I have the honor to state, for the information of His Honor the Deputy Governor, that your letter, No. 2752, dated 22d October, dissolving the Coal Committee, was received on the 27th ultimo. The three following days having been native holidays, it was not circulated until the 1st instant, from which date the Hurkaru and Painter tertained on the Establishment of the Committee have been discharged, but the services of the writer may be necessary for a few weeks longer.

2. I beg herewith to annex a list of office furniture and collections, for the disposal of which I solicit the orders of Government, as well as of the Committee record.

· I have, &c.

(Signed) . McClelland, Late Secretary Coal and Iron Committee.

Calcutta, the 10th Nov., 1845.

Mural tables containing Geological collections,	No.	3
Almirah,		1
Collections of specimens of coal and iron ores from various parts,	1)	3
Polin-hooks of records,		5
(Simula) I M-C-		

Secretary, late Coal Committee.

No. 3088.

OM THE UNDER-SECRETARY TO THE GOVERNMENT OF BENGAL TO THE SECRETA-

EAM.

Sin,—In reply to your letter of the 10th instant, I am directed to request that you will worked to the Secretary to the Asiatic Society, the collections, records, &c. of the late oal Committee, for deposit in the Society's rooms.

(Signed) A. TURNBULL,

Under-Secretary to the Government of Bengal.

Dated, Fort William, 29th Nov., 1845.

(True Copies.)

A. TURNBULL,

Finder-Secretary to the Government of Bengal.

For all the foregoing presentations and communications the best hanks of the Society were accorded.

